ENVIRONMENTAL CHEMICAL CORPORATION

Li Tungsten

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #07-05098-OR

June 19, 2007

EBERLINE SERVICES/OAK RIDGE LABORATORY
OAK RIDGE, TN

AR1

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
I	Chain Of Custody	004
II	Sample Acknowledgement	010
III	Case Narrative	013
IV	Analytical Results Summary	017
V	Analytical Standard	020
VI	Quality Control Sample Results Summary	044
VII	Laboratory Technician's Notes	053
VIII	Analytical Data (Isotopic Uranium)	075
IX	Analytical Data (Isotopic Thorium)	116
X	Analytical Data (Radium-226)	157
XI	Analytical Data (Radium-228)	190
XII	Barium-133 Analytical Tracer Data	207
	Last Page Number 222	

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 07.05098

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		5/18/07	ICAM	Sample Log-In
		6/15/07	JB	Data Compilation
		6-18-07	MLT	Technical Data Review MRM 6/19/07
		6/19/07		Data Entry/Electronic Deliverable
		6/19/07		Case Narrative
		6/19/07		Electronic Deliverable Proof
		6/19/07		Samples Analyzed within Holding Time CES
		6/19/07		QA/QC Review
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems,Etc	Date/Initials

Date package approved by: _____ 6/19/07

Laboratory Manager Date

SECTION I

CHAIN OF CUSTODY

Chain of Custody Record

07.05098

ENVIRONMENTAL CHEMICAL CORPORATION
1746 Colorado Blvd., Suite 350
Lakewood, CO 80401
Phone: (303) 298-7607
Fax: (303) 298-7837

COC Number: _____

Customer Name: ECC
Address: 63 Herbhill Rd, Glen Cove, NY 11542
Contact: Ted Johnson
Phone: 305-472-8834
Fax: _____

ECC Project Manager: Glenn Henderson
Sampler Name: M. LaBarre
ECC Project Number: 5C10
Customer Project Name: Li Tungsten

SAMPLE NUMBER	DATE	TIME	TYPE	CLIENT SAMPLE IDENTIFIER	TESTS	CONTAINER(S)	MATRIX
5601-FSS-SW5-10	5 11/21/06	1110	Soil	FSS	Ra-226, Ra 228, TSU-U Tho-Th	1 Gallon Bag	Soil
				N A			

Notes:

Request Turnaround Time: Standard

Laboratory Receipt Information
Cooler/Container Intact? Yes____ No____
Samples Received at below 4°C? Yes____ No____
Sample Containers Intact? Yes____ No____
Cooler/Container Custody Seal? Yes____ No____

RECEIVED
MAY 18 2007
BY: LCBannister

CUSTODY TRANSFER RECORD

Relinquished by: (signature)	Company:	Date:	Time:	Received by: (signature)	Company:	Date:	Time:
TJ	ECC	5/17/06	16:30	LCBannister	Eberline Services	5-18-07	0900
Relinquished by: (signature)	Company:	Date:	Time:	Received by: (signature)	Company:	Date:	Time:
Relinquished by: (signature)	Company:	Date:	Time:	Received by: (signature)	Company:	Date:	Time:
Relinquished by: (signature)	Company:	Date:	Time:	Received by: (signature)	Company:	Date:	Time:

EBERLINE SERVICES

Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	07-05098
Lab Deadline	6/1/2007
Analysis	UUISO - Level 4
Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	62	G1.1

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0945	Kenny Sellers	5-21-07
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0810	Kenny Sellers	5-22-07
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	[illegible] 0810
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	5/23/07 1315
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	CVM	5/23/07 1315
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	6-1-07 0855
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	6-1-07 0904
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	6-4-07 0913
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	07-05098
Lab Deadline	6/1/2007
Analysis	ThISO - Level 4
Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	62	G1.1

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0745	Kenny Sellers	5-21-07
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0810	Kenny Sellers	5-22-07
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	[illegible] 0810
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	5/24/07 1730
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	CUM	5/24/07 1230
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	5-24-07 0750
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	5-31-07 0857
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	5-31-07 1121
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	07-05098
Lab Deadline	6/1/2007
Analysis	Ra226 - Level 4
Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	62	G1.1

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	(Rough Prep)	Prep	Separations	Count Room 0945	Kenny Schleig	5-21-07
Relinquished by	Sample Storage	(Rough Prep)	Prep	Separations	Count Room 1510	Kenny Schleig	5-22-07
Received by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room		5/24/07 0511
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		5/24/07 1200
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 1200		5/24/07
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 1210		5/29/07
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		5-29-07 12:10
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		5-30-07 0610
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	07-05098
Lab Deadline	6/1/2007
Analysis	Ra228 - Level 4
Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	62	G1.1

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	(Rough Prep)	Prep	Separations	Count Room 0445	Kenny Salling	5-21-07
Relinquished by	Sample Storage	(Rough Prep)	Prep	Separations	Count Room 0810	Kenny Salling	5-22-07
Received by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 1200		5/24/07
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 1210		5/29/07
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		5-29-07 12:10
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		5-30-07 0530
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 0600		5/30/07
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room 0910		6/14/07
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		6-14-07 0910
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)		6-14-07 14:30
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Environmental Chemical Corporation	5601.000.ES	Environmental	05/18/2007	28	07-05098
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
Li Tungsten	Li Tungsten	H	06/01/2007	06/07/2007	06/15/2007

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	ThISO	UUISO	Ttl
01	LCS	05/18/07	SO	G1.1	X	X	X	X	4
02	BLANK	05/18/07	SO	G1.1	X	X	X	X	4
03	DUP	05/18/07	SO	G1.1	X	X	X	X	4
04	5601-FSS-SU5-1015	11/21/06 11:10	SO	G1.1	X	X	X	X	4
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
									0
	Totals Per Analysis (non QA samples)				1	1	1	1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice	Accounts Payable	**Report Data**	Ted Johnson
	Environmental Chemical Corporation		Li Tungsten Superfund Site
	1125 Route 22 West, #310		63 Herb Hill Road
	Bridgewater, NJ 08801		Glen Cove, NY 11542
Voice	908-595-1777	*Voice*	303-472-8834
Fax	908-595-1776	*Fax*	
Contact	Ted Johnson		
Voice	303-472-8834		
Fax			

Printed: 5/18/2007 1:02 PM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 07.05098

SAMPLE MATRIX/MATRICES:

(CIRCLE ONE OR BOTH)

AQUEOUS (NON-AQUEOUS)

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	(Y)	N	
If aqueous, properly preserved	Y	N	(N/A)

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	(Y)	N
Unbroken on outside of package?	(Y)	N
Present on samples?	(Y)	N
Unbroken on samples?	(Y)	N
Was chain of custody present upon sample receipt?	(Y)	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: _____

SIGNATURE: JC Bannister DATE: 5/18/07

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

Oak Ridge Laboratory
601 Scarboro Road
Oak Ridge, TN 37830
Phone (865) 481-0683
Fax (865) 483-4621

EBS-OR-25897

June 19, 2007

Ted Johnson
Environmental Chemical Corporation
63 Herb Hill Road
Glen Cove, NY 11542

CASE NARRATIVE
Work Order # 07-05098-OR

SAMPLE RECEIPT

This work order contains one soil sample received 05/18/07. This sample was analyzed for Isotopic Uranium, Isotopic Thorium and Radium-226/228.

CLIENT ID	LAB ID
5601-FSS-SU5-1015	07-05098-04

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Isotopic Thorium was analyzed using Method EML Th-01 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 1-sigma value.

Method Detection Limits (MDA's) reflected on the Preliminary Data Report (PDR) are calculated using the equation from ANSI N13.30 (see below) for different blank and sample counting times. The MDA calculation used by the alpha spectroscopy software assumes an equal count time for the sample and background, and may be therefore slightly different than the MDA reflected on the PDR.

ANSI 13.30 $$MDA = \frac{3.29\sqrt{R_b T_g \left(1+\frac{T_g}{T_b}\right)} + 3}{K T_g}$$

Where:
R_b = Background Count Rate
T_g = Count Time of Sample
T_b = Background Count Time
K = Calibration and Calculation Factors in Appropriate Units

ISOTOPIC URANIUM

Sample was prepared by removing a representative aliquot from the sample followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

Sample demonstrated slightly positive results for Uranium-234 and Uranium-238 activity. Sample demonstrated background equivalent results for Uranium-235 activity. Chemical recovery was acceptable for all samples. Results for the Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated background or non-detect equivalent activity. Results for the Uranium-234, Uranium-235 and Uranium-238 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

ISOTOPIC THORIUM

Sample was prepared by removing a representative aliquot from the sample followed by mixed acid digestions as appropriate. Thorium was selectively extracted by ion exchange. Thorium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Thorium-228, Thorium-230 and Thorium-232. Chemical recovery was determined by the use of a Thorium-229 tracer. Activity of the Thorium-229 tracer was determined by alpha spectroscopy using an energy specific region of interest.

Sample demonstrated background equivalent results for Thorium-228, Thorium-230 and Thorium-232 activity. Chemical recovery was acceptable for all samples. Results for the Thorium-228, Thorium-230 and Thorium-232 method blank demonstrated background equivalent activity. Results for the Thorium-228 replicate demonstrated a slightly high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Thorium-230 and Thorium-232 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Thorium-228, Thorium-230 and Thorium-232 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Sample was prepared by removing a representative aliquot from the sample followed by mixed acid digestions as appropriate. This was followed by selective sulfate precipitation of the Radium. Sample was then mounted by semi-micro-precipitation onto micro-porous filter media. Sample was counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Sample demonstrated background equivalent results for Radium-226 activity. Chemical recovery was acceptable for all samples. Results for the Radium-226 method blank demonstrated background equivalent activity. Results for the Radium-226 replicate demonstrated a high relative percent difference and normalized difference. Results are statistically equivalent with consideration of the ±2-sigma counting uncertainties. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitate was redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitate was filtered and Actinium-228 beta emissions were then

ANALYTICAL RESULTS CONTINUED

RADIUM-228 CONTINUED

counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, of which the sample activity was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Sample demonstrated background equivalent results for Radium-228 activity. Chemical recovery was acceptable for all samples. Results for the Radium-228 method blank demonstrated background equivalent activity. Results for the Radium-228 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 6/19/2007

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Services
Final Report of Analysis

Report To:	Work Order Details:	
Ted Johnson	*SDG:*	**07-05098**
Li Tungsten Superfund Site	*Purchase Order:*	5601.000.ES
63 Herb Hill Road	*Analysis Category:*	ENVIRONMENTAL
Glen Cove, NY 11542	*Sample Matrix:*	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	5/29/2007	07-05098	Radium-226	EPA 903.0 Modified	1.03E+01	4.76E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	5/29/2007	07-05098	Radium-226	EPA 903.0 Modified	1.01E+01	1.34E+00	6.83E-01	1.72E-01	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	5/29/2007	07-05098	Radium-226	EPA 903.0 Modified	-1.35E-02	1.21E-02	6.16E-03	2.47E-01	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/29/2007	07-05098	Radium-226	EPA 903.0 Modified	1.15E+00	3.63E-01	1.85E-01	2.34E-01	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/29/2007	07-05098	Radium-226	EPA 903.0 Modified	7.02E-01	2.50E-01	1.28E-01	1.56E-01	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	6/14/2007	07-05098	Radium-228	EPA 904.0 Modified	1.93E+01	8.70E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	6/14/2007	07-05098	Radium-228	EPA 904.0 Modified	1.66E+01	8.64E-01	6.80E-01	1.04E+00	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	6/14/2007	07-05098	Radium-228	EPA 904.0 Modified	4.15E-01	4.88E-01	2.49E-01	1.15E+00	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/14/2007	07-05098	Radium-228	EPA 904.0 Modified	2.00E-01	4.14E-01	2.11E-01	9.90E-01	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/14/2007	07-05098	Radium-228	EPA 904.0 Modified	-8.44E-02	3.21E-01	1.64E-01	7.95E-01	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-228	EML Th-01 Modified	4.79E+00	1.72E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-228	EML Th-01 Modified	4.15E+00	8.86E-01	4.52E-01	7.21E-02	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-228	EML Th-01 Modified	-1.85E-02	1.45E-02	7.39E-03	1.21E-01	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-228	EML Th-01 Modified	1.69E+00	4.85E-01	2.47E-01	1.45E-01	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-228	EML Th-01 Modified	1.33E+00	4.04E-01	2.06E-01	1.22E-01	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-230	EML Th-01 Modified	5.34E+00	1.44E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-230	EML Th-01 Modified	4.68E+00	9.84E-01	5.02E-01	7.83E-02	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-230	EML Th-01 Modified	6.99E-02	7.16E-02	3.65E-02	9.39E-02	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-230	EML Th-01 Modified	1.00E+00	3.15E-01	1.61E-01	1.06E-01	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-230	EML Th-01 Modified	1.20E+00	3.55E-01	1.81E-01	8.69E-02	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-232	EML Th-01 Modified	4.79E+00	1.72E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-232	EML Th-01 Modified	3.81E+00	8.22E-01	4.19E-01	8.84E-02	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	5/31/2007	07-05098	Thorium-232	EML Th-01 Modified	-5.29E-03	7.55E-03	3.85E-03	8.42E-02	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-232	EML Th-01 Modified	1.17E+00	3.51E-01	1.79E-01	1.16E-01	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	5/31/2007	07-05098	Thorium-232	EML Th-01 Modified	1.12E+00	3.38E-01	1.72E-01	1.07E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

Oak Ridge Laboratory

601 Scarboro Road, Oak Ridge, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Services
Final Report of Analysis

Report To:	Work Order Details:	
Ted Johnson	*SDG:*	**07-05098**
Li Tungsten Superfund Site	*Purchase Order:*	5601.000.ES
63 Herb Hill Road	*Analysis Category:*	ENVIRONMENTAL
Glen Cove, NY 11542	*Sample Matrix:*	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-234	EML U-02 Modified	7.98E+00	2.87E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-234	EML U-02 Modified	7.47E+00	1.29E+00	6.56E-01	1.17E-01	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-234	EML U-02 Modified	1.08E-01	8.80E-02	4.49E-02	1.06E-01	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-234	EML U-02 Modified	7.75E-01	2.25E-01	1.15E-01	7.89E-02	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-234	EML U-02 Modified	9.12E-01	2.60E-01	1.33E-01	6.22E-02	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-235	EML U-02 Modified	3.62E-01	1.30E-02			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-235	EML U-02 Modified	2.09E-01	1.26E-01	6.45E-02	8.18E-02	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-235	EML U-02 Modified	3.42E-02	5.35E-02	2.73E-02	8.65E-02	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-235	EML U-02 Modified	4.46E-02	5.19E-02	2.65E-02	4.03E-02	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-235	EML U-02 Modified	4.41E-02	5.84E-02	2.98E-02	9.00E-02	pCi/g
07-05098-01	LCS	KNOWN	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-238	EML U-02 Modified	7.77E+00	2.80E-01			pCi/g
07-05098-01	LCS	SPIKE	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-238	EML U-02 Modified	7.73E+00	1.32E+00	6.75E-01	7.73E-02	pCi/g
07-05098-02	MBL	BLANK	05/18/07 00:00	5/18/2007	6/4/2007	07-05098	Uranium-238	EML U-02 Modified	2.22E-02	5.46E-02	2.79E-02	1.28E-01	pCi/g
07-05098-03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-238	EML U-02 Modified	7.20E-01	2.15E-01	1.10E-01	8.89E-02	pCi/g
07-05098-04	DO	5601-FSS-SU5-1015	11/21/06 11:10	5/18/2007	6/4/2007	07-05098	Uranium-238	EML U-02 Modified	8.41E-01	2.47E-01	1.26E-01	6.20E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (1-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

Oak Ridge Laboratory

601 Scarboro Road, Oak Ridge, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials MK

U-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities: Refer to attached technical data sheet

Radioactive Daughters: Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

		CURRENT DATE	12/13/2006 0:00
SOLUTION REFERENCE #	IPL 479-50	SOLUTION #	U-8

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234, 235, 238}U$	4.468E+09	1.632E+12

Radionuclide	$^{234, 235, 238}U$	Reference Date	1/1/1995 0:00
Certified Activity	8.016E+00 µCi		
Certified Concentration	µCi per gram		

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution

Uranyl nitrate in dilute HNO_3

Dilution Instructions: **Dilution Solvent Used** 1M HNO_3

Dilute to a volume of 1000.00 **milliliters**

Certified Total Activity of 8.0160 µCi **Which Equals** 1.780E+07 **dpm at the date listed above**

And after dilution the activity of this solution is 1.77955E+04 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 13, 2007

Recertified By _____ Date: 12/13/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

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MP-009

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	12/13/2006 0:00
Solution Reference #	IPL 479-50	Solution #	U-8a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234, 235, 238}U$	4.468E+09	1.632E+12

Radionuclide of Interest: $^{234, 235, 238}U$

Parent Solution Conc.: 1.7796E+04 dpm/ml

Reference Date: 1/1/1995 0:00

Chemical Composition of Standard Solution

Uranly Nitrate in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	4.0000	ml
Total Activity:	7.1182E+04	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 7.1182E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Isotopic Distribution as:

U-238 Atom % = 48.239	U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25	U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501	U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml

All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: December 13, 2007

Recertified By _____ Date: 12/13/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

RECORD COPY

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67
Measurement	Reference date:		01 March 2000
	Radioactive concentration U-232		6.739E+03 becquerels per gram of solution
	which is equivalent to		1.821E-01 microcuries per gram of solution
	Mass of solution		5.35€ grams
	Volume of solution		5.035 millilitres
	Total activity of U-232		3.61E+04 becquerels
	which is equivalent to		9.76E-01 microcuries

Accuracy

Method of measurement (see reverse of this certificate)
Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity

Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity

The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition

Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data

Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks

For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

AEA Technology is the trading name of AEA Technology plc

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 12/14/2006 0:00

SOLUTION REFERENCE #: AEA/Amersham 92/232/67 SOLUTION #: U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide: ^{232}U Reference Date: 3/1/2000 0:00

Certified Activity: 9.760E-01 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams

Empty Ampoule: Weight, Grams

Solution Net: Weight, Grams

Total Activity in Ampoule: 0.9760 µCi

Chemical Composition of Standard Solution

$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions: Dilution Solvent Used: 2M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.9760 µCi Which Equals 2.167E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.167E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 14, 2007

Recertified By _____ Date: 12/14/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/11/07

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	12/14/2006 0:00
Solution Reference #	AEA/Amersham 92/232/67	Solution #	U-10a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide of Interest: ^{232}U
Parent Solution Conc.: 2.167E+03 dpm/ml

Reference Date: 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used: 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 14, 2007

Recertified By _____ Date: 12/14/2006 0:00

Verified & Approved By _____ Date: 11/9/07

QC Approval _____ Date: 11/11/07

Th-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-232	Customer:	TMA EBERLINE
Half Life:	(1.405± 0.006) x 10^10 years	P.O.No.:	VH1632
Catalog No.:	7232	Reference Date:	November 1 1993 12:00 PST.
Source No.:	435-104-2	Contained Radioactivity:	(Th-232) 0.0933 μCi.
		Contained Radioactivity:	(Th-232) 3.45 kBq.

Description of Solution

a. Mass of solution:	11.9712 g (in a 10 ml flame sealed ampoule)	
b. Chemical form:	Th(NO3)4 in water	
c. Carrier content:	None added	
d. Density:	Approx. 1.21	g/ml @ 20°C.

Radioimpurities: None detected (other than daughters).

Radioactive Daughters
Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208

Radionuclide Concentration
(Th-232) 0.00779 μCi/g.

Method of Calibration
Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability
This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)
See reverse side for Leak Test(s) applied to this source.

Notes
1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

anna U. Mna
QUALITY CONTROL

Nov. 8, 1993
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
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(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 12/14/2006 0:00

SOLUTION REFERENCE #: IPL 435-104-2

SOLUTION #: Th-8

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}Th, ^{228}Th	1.405E+10	5.132E+12

Radionuclide: $^{232\ \&\ 228}Th$

Reference Date: 11/1/1993 0:00

Certified Activity: 9.330E-02 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	18.8415	Weight, Grams
Empty Ampoule	6.9296	Weight, Grams
Solution Net	11.9119	Weight, Grams
Total Activity in Ampoule	0.0933	µCi

Chemical Composition of Standard Solution

$Th(NO_3)_4$ in H2O

Dilution Instructions:

Dilution Solvent Used: 1% Nitric Acid

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0933 µCi Which Equals 2.071E+05 dpm at the date listed above

And after dilution the activity of this solution is 2.071E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 14, 2007

Recertified By _____ Date: 12/14/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/11/07

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	12/14/2006 0:00
Solution Reference #	IPL 435-104-2	Solution #	Th-8b

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{228\ \&\ 232}Th$	1.405E+10	5.132E+12

Radionuclide of interest: $^{228\ \&\ 232}Th$

Parent Solution Conc.: 2.07E+02 dpm/ml

Reference Date: 11/1/1993 0:00

Chemical Composition of Standard Solution

$Th(NO_3)_4$ in 1% HNO_3

Dilution Instructions:

Dilution Solvent Used: 1% Nitric Acid

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	500.0000	ml
Total Activity:	1.0355E+05	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 1.0355E+02 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 14, 2006

Recertified By _____ Date: 12/14/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/11/07

QA/QC REVIEWED
Date 10/14/91 Initials WT 10/14/91 WT

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Received
OCT 14 1991
TMA/Eberline
Oak Ridge Lab

Radionuclide	Th-230	Customer:	TMA EBERLINE
Half Life:	(7.54 ± 0.03) x 10^4 years	P.O.No.:	TT4944
Catalog No.:	7230	Reference Date:	November 1 1991 12:00 PST.
Source No.:	388-116	Contained Radioactivity:	1.036 µCi.

Description of Solution

a. Mass of solution:	5.0042	grams.
b. Chemical form:	Th(NO3)4 in 0.1N HNO3	
c. Carrier content:	None added	
d. Density:	1.0016	gram/ml @ 20°C.

Radioimpurities

See attached technical data sheet

Radioactive Daughters

See attached technical data sheet

Radionuclide Concentration

0.207 µCi/gram.

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±2.0%
b. Random uncertainty in assay:	±0.5%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay(and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

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EBERLINE SERVICES

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 12/30/2006 0:00

SOLUTION REFERENCE #: IPL 388-116 SOLUTION #: Th-1

Principal Radionuclide	Half Life, Years	Half Life, Days
^{230}Th	7.540E+04	2.754E+07

Radionuclide: ^{230}Thorium

Reference Date: 11/1/1991 0:00

Certified Activity: 1.036E+00 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	9.2660	Weight, Grams
Empty Ampoule	4.6218	Weight, Grams
Solution Net	4.6442	Weight, Grams
Total Activity in Ampoule	1.0360	µCi

Chemical Composition of Standard Solution

$^{230}Th(NO_3)_4$ in 0.1N HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1N HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0360 µCi Which Equals 2.300E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.300E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 30, 2007

Recertified By _____ Date: 12/30/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

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Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	12/30/2006 0:00
Solution Reference #	IPL 388-116	Solution #	Th-1b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{230}Th	7.540E+04	2.754E+07

Radionuclide of Interest: ^{230}Thorium
Parent Solution Conc.: 2.30E+03 dpm/ml

Reference Date: 11/1/1991 0:00

Chemical Composition of Standard Solution
$^{230}Th(NO_3)_4$ in 0.1N HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1N HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	10.0000	ml
Total Activity:	2.2999E+04	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 2.2999E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 30, 2007

Recertified By _____ Date: 12/30/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

Th-19

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-229	**Customer:**	EBERLINE SERVICES
Half-life:	7340 ± 160 years	**P.O. No.:**	00009633
Catalog No.:	7229	**Reference Date:**	15-Jan-02 12:00 PST
Source No.:	867-54	**Contained Radioactivity: (Th-229 only)**	1.013 µCi 37.48 kBq

Physical Description:

A.	Mass of solution:	5.0147 g in 5 mL flame-sealed ampoule
B.	Chemical form:	$Th(NO_3)_4$ in 0.1M HNO_3
C.	Carrier content:	10µg Th/mL
D.	Density:	1.0016 g/mL @ 20°C.

Radioimpurities:

None detected (daughters in equilibrium)

Radionuclide Concentration: 0.2020 µCi/g, 7.474 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

Peak energy used for integration:	193.5 keV
Branching ratio used:	0.0441 gammas per decay

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.7 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.0 %
D.	Total uncertainty at the 99% confidence level:	± 3.1 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA Technical Report Series No. 261.
- This solution has a working life of 5 years.

[signature] — Quality Control

9-Jan-02 — Date Signed

IPL Ref. No.: 867-54

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 1/3/2007 0:00

SOLUTION REFERENCE #: IPL 867-54 | SOLUTION #: Th-18

Principal Radionuclide	Half Life, Years	Half Life, Days
^{229}Th	7.340E+03	2.681E+06

Radionuclide: ^{229}Th
Certified Activity: 1.013E+00 µCi
Certified Concentration: µCi per gram

Reference Date: 1/15/2002 0:00

Ampoule /Solution Gross	8.7752	Weight, Grams
Empty Ampoule	3.7591	Weight, Grams
Solution Net	5.0161	Weight, Grams
Total Activity In Ampoule	1.0130	µCi

Chemical Composition of Standard Solution

$^{229}Th(NO_3)_4$ in 0.1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1 M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0130 µCi Which Equals 2.249E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.249E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 3, 2008

Recertified By _____ Date: 1/3/2007 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.7; 9/29/99
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	1/3/2007 0:00
Solution Reference #	IPL 867-54	Solution #	Th-18a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{229}Th	7.340E+03	2.681E+06

Radionuclide of Interest: ^{228}Th
Parent Solution Conc.: 2.25E+03 dpm/ml

Reference Date: 1/15/2002 0:00

Chemical Composition of Standard Solution
$TH(NO_3)_4$ in 0.1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.2490E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.2490E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 3, 2008

Recertified By _____ Date: 1/3/2007 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

Ba-6
(# 6a)

National Institute of Standards & Technology

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 11/6/2006 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium

Reference Date: 9/1/1993 0:00

Certified Activity: _____ µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 6, 2007

Recertified By _____ Date: 11/18/06

Verified & Approved By _____ Date: 11/27/06

QC Approval _____ Date: 11/27/06

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	QCP-009-1-A	Date	11/6/06
Solution Reference #	NIST SRM4251C	Solution #	Ba-6a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.048E+01	3.828E+03

Radionuclide of Interest: ^{133}Ba

Parent Solution Conc.: 1.48E+05 dpm/ml

Reference Date: 9/1/1993 0:00

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml

Total Activity: 3.6950E+06 dpm

Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 6, 2007

Recertified By _____ Date: 11/18/06

Verified & Approved By _____ Date: 11/27/06

QC Approval _____ Date: 11/27/06

Ra-5

QA/QC REVIEWED
Date 2/8/94 Initials MT

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution:	5.1864 g (in a 5 ml Flame Sealed Ampoule)	
b. Chemical form:	Ra(NO3)2 in 1 N HNO3	
c. Carrier content:	None added	
d. Density:	1.0318	g/ml @ 20°C.

Radioimpurities: None detected(other than daughters)

Radioactive Daughters

Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.4%
b. Random uncertainty in assay:	±3.1%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±4.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Ann U. Kuan
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 12/29/2006 0:00

SOLUTION REFERENCE #: IPL 453-26 SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution

$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of: 1000.00 milliliters

Certified Total Activity of: 1.0010 µCi Which Equals: 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is: 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 29, 2007

Diluted By _____ Date: 12/29/2006

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/11/07

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP 009	Date	12/29/2006 0:00
Solution Reference #	IPL-453-26	Solution #	Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{228}Radium	1.600E+03	5.844E+05

Radionuclide of Interest	^{226}Radium	Reference Date	2/1/1994 0:00
Parent Solution Conc.	2.22E+03 dpm/ml		

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions: **Dilution Solvent Used** 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	20.0000 ml	Final Activity Concentration:	4.4440E+01 dpm/ml
Total Activity:	4.4440E+04 dpm	This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.	
Final Volume:	1000.00 ml		

NOTES:

Expiration Date: December 29, 2007

Recertified By _____ Date: 1/4/2007 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/11/07

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

61680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	3.586 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	June 4, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.1%
SYSTEMATIC:	3.6%
RANDOM:	1.5%

RECEIVED 6/11/01 INITIALS

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.00872 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 00008864, Item 1

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: ACMcM 6/8/01

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 12/29/2006 0:00

SOLUTION REFERENCE #: Analytics 61680-416 | SOLUTION #: Ra-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{228}Ra	5.750E+00	2.100E+03

Radionuclide: ^{228}Ra

Reference Date: 6/4/2001 0:00

Certified Activity: 9.692E-02 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0969	µCi

Chemical Composition of Standard Solution

$^{228}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0969 µCi Which Equals 2.152E+05 dpm at the date listed above

And after dilution the activity of this solution is 2.152E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 29, 2007

Recertified By _____ Date: 12/29/2006 0:00

Verified & Approved By _____ Date: 1/9/07

QC Approval _____ Date: 1/10/07

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	UUISO	1	pCi	g	Environmental Chemical Corporation

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	1.45	93.68%	8.79%	100.00%	3.60%	7.98E+00	2.87E-01	7.47E+00	6.56E-01	U-8a	3.52E+01	3.60E+00	5.02E-01
U-235	4.61	57.72%	30.86%	100.00%	3.60%	3.62E-01	1.30E-02	2.09E-01	6.45E-02	U-8a	1.60E+00	3.60E+00	5.02E-01
U-238	0.14	99.37%	8.74%	100.00%	3.60%	7.77E+00	2.80E-01	7.73E+00	6.75E-01	U-8a	3.44E+01	3.60E+00	5.02E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

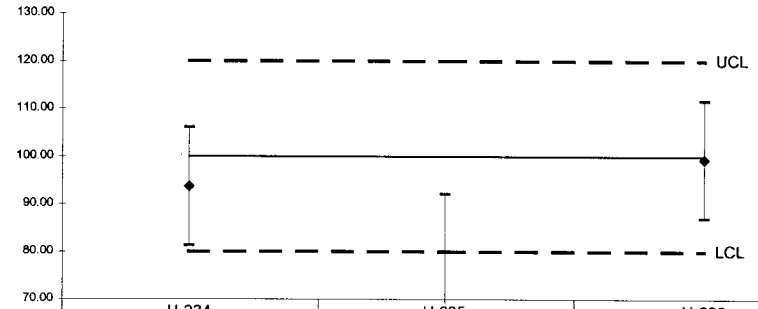
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
U-234	1.53	16.29	9.12E-01	1.33E-01	7.75E-01	1.15E-01
U-235	0.02	1.04	4.41E-02	2.98E-02	4.46E-02	2.65E-02
U-238	1.43	15.62	8.41E-01	1.26E-01	7.20E-01	1.10E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.94	OK	OK			OK	OK
0.58	INV	INV			OK	OK
0.99	OK	OK			OK	OK

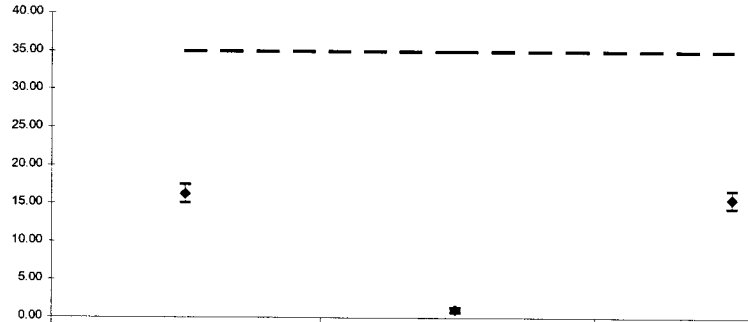
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	UUISO	1	pCi	g	Environmental Chemical Corporation

LCS % Recovery



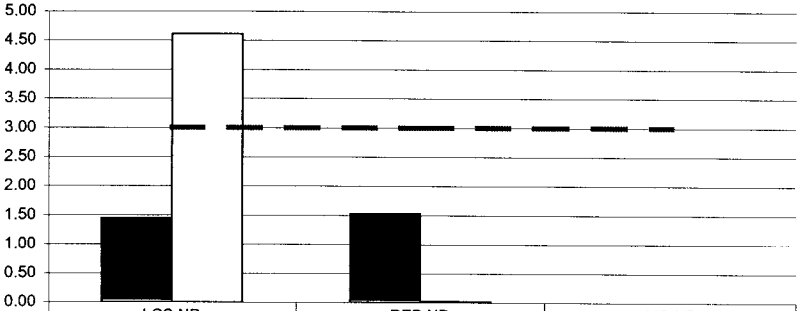
	U-234	U-235	U-238
Lower Error	81.29	23.26	87.03
Upper Error	106.07	92.18	111.72
%R	93.68	57.72	99.37
LCL	80	80	80
Mean	100	100	100
UCL	120	120	120

Replicate Sample RPD



	U-234	U-235	U-238
Lower Error	17.48	1.37	16.80
Upper Error	15.09	0.71	14.44
RPD	16.29	1.04	15.62
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	1.45	1.53	0.00
U-235	4.61	0.02	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	ThISO	1	pCi	g	Environmental Chemical Corporation

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
TH-228	2.66	86.77%	10.88%	100.00%	3.60%	4.79E+00	1.72E-01	4.15E+00	4.52E-01	Th-8b	1.04E+02	3.60E+00	1.03E-01
TH-230	2.52	87.71%	10.73%	100.00%	2.70%	5.34E+00	1.44E-01	4.68E+00	5.02E-01	Th-1b	2.35E+01	2.70E+00	5.04E-01
TH-232	4.42	79.56%	11.01%	100.00%	3.60%	4.79E+00	1.72E-01	3.81E+00	4.19E-01	Th-8b	1.04E+02	3.60E+00	1.03E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

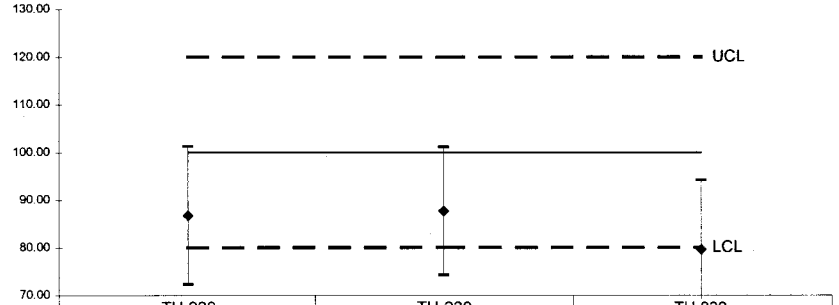
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
TH-228	2.15	23.47	1.33E+00	2.06E-01	1.69E+00	2.47E-01
TH-230	1.63	18.23	1.20E+00	1.81E-01	1.00E+00	1.61E-01
TH-232	0.35	3.85	1.12E+00	1.72E-01	1.17E+00	1.79E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.87	OK	OK			INV	OK
0.88	OK	OK			OK	OK
0.80	OK	INV			OK	OK

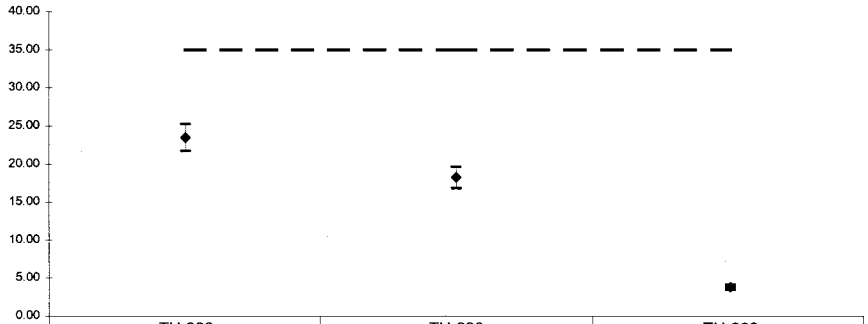
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	ThISO	1	pCi	g	Environmental Chemical Corporation

LCS % Recovery



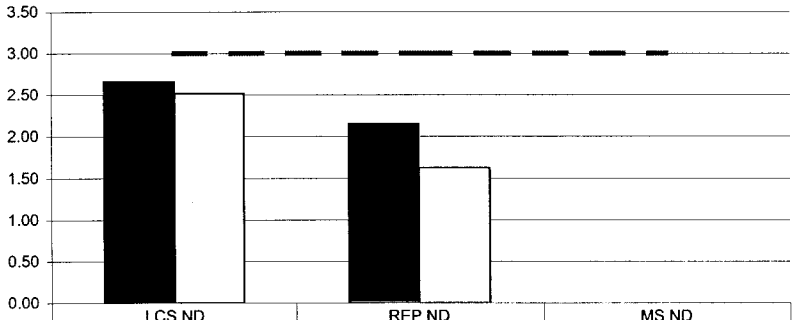
	TH-228	TH-230	TH-232
Lower Error	72.29	74.28	64.95
Upper Error	101.26	101.14	94.17
%R	86.77	87.71	79.56
LCL	80	80	80
Mean	100	100	100
UCL	120	120	120

Replicate Sample RPD



	TH-228	TH-230	TH-232
Lower Error	25.24	19.64	4.14
Upper Error	21.71	16.82	3.55
RPD	23.47	18.23	3.85
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
TH-228	2.66	2.15	0.00
TH-230	2.52	1.63	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	Ra226	1	pCi	g	Environmental Chemical Corporation

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.53	98.05%	6.73%	100.00%	4.60%	1.03E+01	4.76E-01	1.01E+01	6.83E-01	Ra-5b	4.42E+01	4.60E+00	5.20E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-226	3.89	48.27	7.02E-01	1.28E-01	1.15E+00	1.85E-01

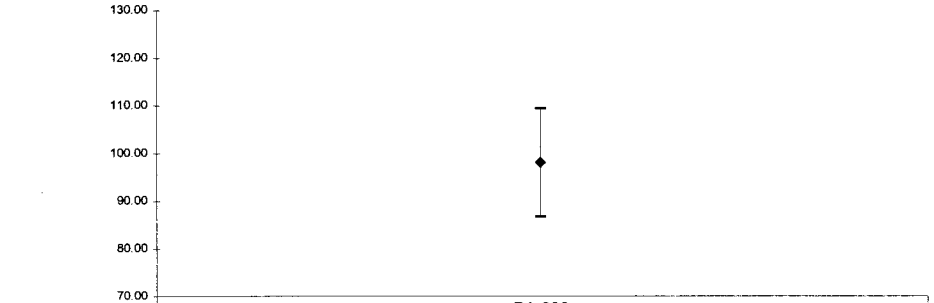
QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.98	OK	OK			INV	INV

Version

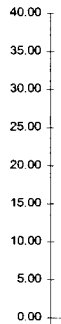
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	Ra226	1	pCi	g	Environmental Chemical Corporation

LCS % Recovery



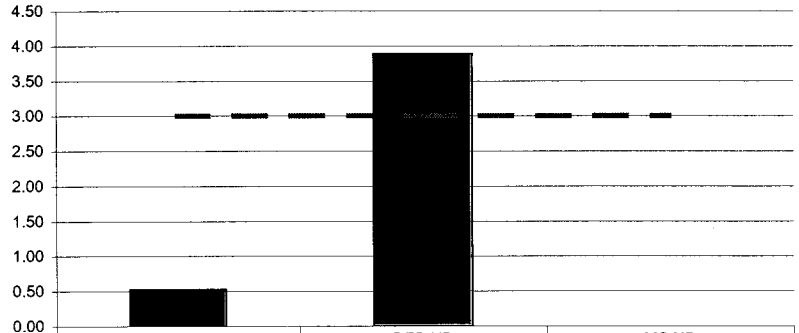
	RA-226
Lower Error	86.72
Upper Error	109.38
%R	98.05
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	52.35
Upper Error	44.19
RPD	48.27
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.53	3.89	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	Ra228	1	pCi	g	Environmental Chemical Corporation

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	6.12	85.68%	4.11%	100.00%	4.50%	1.93E+01	8.70E-01	1.66E+01	6.80E-01	Ra-10	1.05E+02	4.50E+00	4.09E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

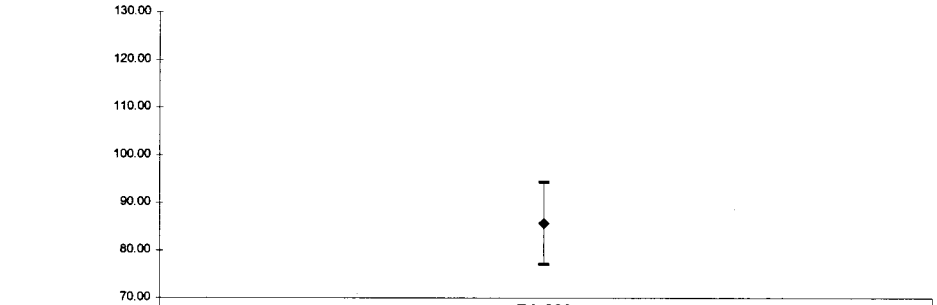
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-228	2.09	490.79	-8.44E-02	1.64E-01	2.00E-01	2.11E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.86	OK	INV			INV	OK

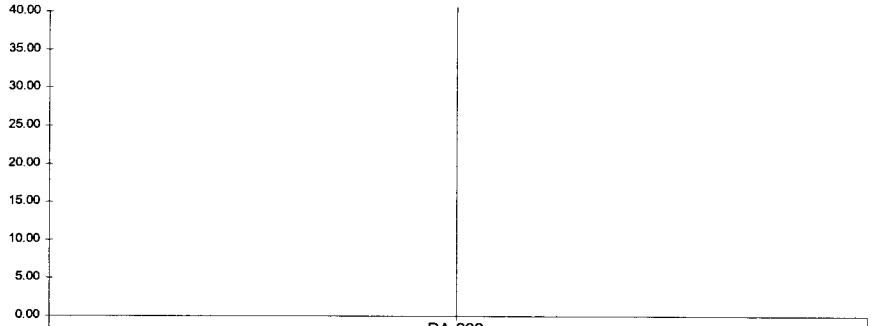
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
07-05098	Ra228	1	pCi	g	Environmental Chemical Corporation

LCS % Recovery



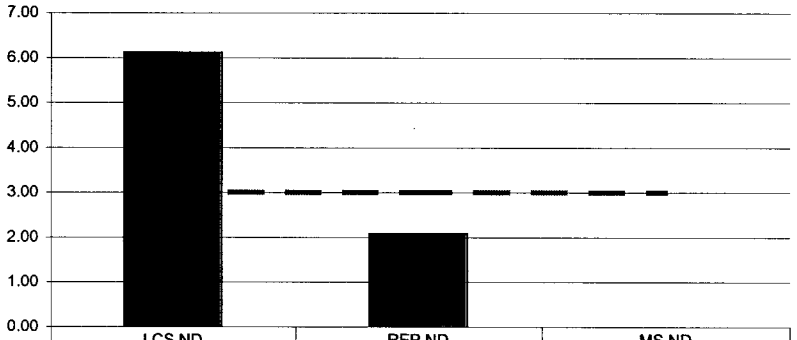
	RA-228
Lower Error	77.08
Upper Error	94.29
%R	85.68
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-228
Lower Error	1284.54
Upper Error	-302.96
RPD	490.79
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	6.12	2.09	0.00
UCL	3	3	3

No Matrix Spike

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO-U NOTES

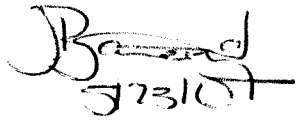
EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:45	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS



EBERLINE SERVICES

Work Order Analysis Notes

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www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:45	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS
2	05/31/07 18:29	CHEM	CMCCUNE	Used column separation technique to elute Uranium fraction (steps 12.2 to 12.2.7 in AP-005 Rev. 9)

5/31/07

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
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www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:45	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS
2	05/31/07 18:29	CHEM	CMCCUNE	Used column separation technique to elute Uranium fraction (steps 12.2 to 12.2.7 in AP-005 Rev. 9)
3	06/01/07 05:46	CHEM	TSMITH	Followed steps 12.2.7 to 12.5.5 in AP-005 rev. 9 . (Precipitated and filtered samples)

6-1-07

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
07-05098	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
005599P	Hydrofluoric Acid	Reagent Grade	JBARNARD	5/23/2007
005597P	Nitric Acid	Reagent Grade	JBARNARD	5/23/2007
005713P	Nitric Acid	Reagent Grade	JBARNARD	5/23/2007
004527P	Sulfuric Acid	Reagent Grade	JBARNARD	5/23/2007
005790P	Anion Exchange Resin	Reagent Grade	TSMITH	5/31/2007
005755S	HCl - HF	6.5N - 0.04N	CMCCUNE	5/31/2007
005532D09	Hydrochloric Acid	0.5N	CMCCUNE	5/31/2007
005592S	Hydrochloric Acid	6.5N	CMCCUNE	5/31/2007
005800S	Hydrochloric Acid	8N	CMCCUNE	5/31/2007
005764P	Hydrochloric Acid	Reagent Grade	CMCCUNE	5/31/2007
005790P	Anion Exchange Resin	Reagent Grade	CMCCUNE	5/31/2007
005814S	HCl - NH4I	8N - 0.1M	CMCCUNE	5/31/2007
005554S	Neodymium Carrier	1 mg/ml	TSMITH	6/1/2007
005601P	Reagent Alcohol	Reagent Grade	TSMITH	6/1/2007
005345P	Titanous Chloride	Reagent Grade	TSMITH	6/1/2007
005772P	Hydrofluoric Acid	Reagent Grade	TSMITH	6/1/2007
005788S	Carbon substrate	Solution	TSMITH	6/1/2007

Alpha #1

Date	Sample #	Client	Load time	CT time	Analysis	Tech
5-31-07	Daily pulser	LAB	0552	10m	NA	
5-31-07	0705098A (1-4)	ECC	0812	2HR 50m	Th	
5-31-07	0705048A (1-4,6,7,9,10)	BJC	0812	2HR 50m	Th	
5-31-07	0705112A (1-4)	Duratek	1116	2HR 50m	Th	
5-31-07	0705112ANT (4)	Duratek	1116	2HR 50m	Th-NT	
5-31-07	0705047A (1-5)	BJC	1116	2HR 50m	Ura	
5-31-07	0705048A (1,2)	BJC	1116	2HR 50m	Ura	
5-31-07	0705048A (1-3,10,11)	BJC	14:40	2 HR 50m	Pu	
5-31-07	0705076A (1-7)	BJC	14:41	2 HR 50m	Am	
~~5-31-07~~	~~0705085A (1-12)~~ 5/31/07 MPA	~~MPA~~	17:30	2 HR 50m	Ra	
5-31-07	0705054A (1-6)	BJC	18:20	5 HR 35m	Pu	
6-1-07	Daily pulser	LAB	0802	10m	NA	
6-1-07	Calibrations	LAB	0823	2½ HR	α-ISO	
6-1-07	0705118A (4)	BJC	1121	2HR 50m	Th	
6-1-07	0705076A (1-7)	BJC	1121	2HR 50m	Np	
6-1-07	0705047A (1-4)	BJC	1121	2HR 50m	Np	
6-1-07	0705119A (1-9)	BJC	1424	2HR 50m	Th	
6-1-07	Weekly BKGD	LAB	20:08	161HR 40m	BKGD	
6-4-07	Daily pulser	LAB	0523	10m	NA	
6-4-07	0705076A (5)	BJC	0613	2HR 50m	Pu	
6-4-07	0705098A (1-4)	ECC	0613	2HR 50m	Ura	
6-4-07	0705112A (1-4)	Duratek	0613	2HR 50m	Ura	
6-4-07	0705112ANT (4)	Duratek	0613	2HR 50m	Ura-NT	
6-4-07	0705091A (1,2)	Duratek	0613	2HR 50m	Ura	

ISO-TH NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	ThISO
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:45	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND CARRIER- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- ADDED 10M KOH AND TICL3 AND PUT SAMPLES BACK IN THE HOT WATER BATH- VORTEXED AND CENTRIFUGED- ADDED 30MLS OF 8N HNO3 TO THE THORIUM PRECIP, VORTEXED AND SUBMITTED TO SEPARATIONS

JBarnard
5/23/07

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	ThISO
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:45	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND CARRIER- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- ADDED 10M KOH AND TICL3 AND PUT SAMPLES BACK IN THE HOT WATER BATH- VORTEXED AND CENTRIFUGED- ADDED 30MLS OF 8N HNO3 TO THE THORIUM PRECIP, VORTEXED AND SUBMITTED TO SEPARATIONS
2	05/30/07 09:26	CHEM	TSMITH	Followed steps 12.3 to 12.3.4 in AP-005 rev. 9 . (Column separation for Thorium)
3	05/31/07 06:06	CHEM	TSMITH	Followed steps 12.3.4 to 12.5.5 in AP-005 rev. 9 . (Precipitated and filtered samples)

5-31-07

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
07-05098	
Analysis Code	Run
ThISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
003255D21	Barium Carrier	50 mg/ml	JBARNARD	5/23/2007
005751S	EDTA	0.25M	JBARNARD	5/23/2007
005599P	Hydrofluoric Acid	Reagent Grade	JBARNARD	5/23/2007
005531D14	Nitric Acid	8N	JBARNARD	5/23/2007
005713P	Nitric Acid	Reagent Grade	JBARNARD	5/23/2007
005486P	Perchloric Acid	Reagent Grade	JBARNARD	5/23/2007
001365D03	Potassium Hydroxide	10M	JBARNARD	5/23/2007
005600P	Potassium Sulfate	Reagent Grade	JBARNARD	5/23/2007
004527P	Sulfuric Acid	Reagent Grade	JBARNARD	5/23/2007
004692P	Titanous Chloride	Reagent Grade	JBARNARD	5/23/2007
005786S	Nitric Acid	8N	TSMITH	5/30/2007
005800S	Hydrochloric Acid	8N	TSMITH	5/30/2007
005778S	Carbon substrate	Solution	TSMITH	5/31/2007
000051D11	Cerium Carrier (Alpha iso)	Solution	TSMITH	5/31/2007
005599P	Hydrofluoric Acid	Reagent Grade	TSMITH	5/31/2007
005601P	Reagent Alcohol	Reagent Grade	TSMITH	5/31/2007

Alpha #1

Date	Sample #	Client	Load time	CT time	Analysis	Tech
5.31.07	Daily pulser	LHD	0552	10 m	NA	[illegible]
5.31.07	0705098A (1-4)	ECC	0812	2HR 50m	TL	[illegible]
5.31.07	0705098A (1-4,6,7,9,10)	BSC	0812	2HR 50m	TL	[illegible]

RA-226 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:43	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES TO 2.8-3.0- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JBarnard
5/23/07

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:43	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES TO 2.8-3.0- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	05/29/07 12:02	CHEM	DJOHNSON	Received samples in EDTA from prep lab. Re-precipitated samples with glacial acetic acid and ammonium sulfate. T0 time of 1050 hours was recorded.Filtered samples on tarred filters and then rinsed c-tubes and funnels with diH2O and filtered. Dried and reweighed samples. Submitted samples to the count room.

5/29/07

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
07-05098	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
004856P	Ammonium Hydroxide	Reagent Grade	JBARNARD	5/23/2007
003255D24	Barium Carrier	1 mg/ml	JBARNARD	5/23/2007
005751S	EDTA	0.25M	JBARNARD	5/23/2007
005599P	Hydrofluoric Acid	Reagent Grade	JBARNARD	5/23/2007
004484D03	Lead Carrier	40 mg/ml	JBARNARD	5/23/2007
005713P	Nitric Acid	Reagent Grade	JBARNARD	5/23/2007
005486P	Perchloric Acid	Reagent Grade	JBARNARD	5/23/2007
003643S	Phenolphthalein Indicator	0.1%	JBARNARD	5/23/2007
005600P	Potassium Sulfate	Reagent Grade	JBARNARD	5/23/2007
004527P	Sulfuric Acid	Reagent Grade	JBARNARD	5/23/2007
000868P	Acetic Acid	Reagent Grade	DJOHNSON	5/29/2007
005186D04	Ammonium Sulfate	200 mg/ml	DJOHNSON	5/29/2007

Date	Sample #	Client	Load time	Count time	Analysis	Tech
5-23-07	Daily pulser	LAB	0401	10m	NA	[illegible]
5-23-07	0705042B (1-4)	BJC	0909	2HR50min	Am	[illegible]
5-23-07	0705041A (1-8)	BJC	0909	2HR50min	Am	[illegible]
5-23-07	0705044A (1-6)	MEC	12:55	2HR50m	UU	[illegible]
5-23-07	0705044A (4-6)	MEC	12:56	2HR50m	UU NT	[illegible]
5/24/07	Daily Pulser	LAB	07:16	10 MIN	NA	AG
5-24-07	0705060A (1-6)	MEC	11:10	2 HR 50m	Np	[illegible]
5-24-07	0705060 A (1-6)	MEC	11:11	2HR50m	UU	[illegible]
5-24-07	0705009 A (1-11)	Weston	16:45	2HR50m	UU	[illegible]
5-24-07	0705121A (1)	ECC	16:46	2HR50m	Ra	[illegible]
5/25/07	Daily Pulser	LAB	07:03	10MIN	NA	AG
5/25/07	CALIBRATIONS	LAB	07:39	2 1/2 HR	α	AG
5-25-07	0705045A (1-4)	BJC	10:50	2HR50m	Am	[illegible]
5-25-07	0705014A (1-4)	USG	10:52	2HR50m	Am	[illegible]
5-25-07	0705014A (1-4)	USG	10:53	2HR50m	UU	[illegible]
5-25-07	Weekly BKGD	LAB	18:10	16HR40m	BKGD	[illegible]
5-29-07	Daily Pulser	LAB	05:00	10min	N/A	[illegible]
5-29-07	0705100 A (1-4)	Tetra	06:00	2HR50	Ra	[illegible]
5-29-07	0705067A (1-6, 8)	AAL	06:02	2HR50m	UU	[illegible]
5-29-07	0705086A (1-4)	DuratekK	11:15	2HR50m	Am	[illegible]
5-29-07	0705086A (1-4)	DuratekK	11:16	2HR50m	Am 243	[illegible]
5-29-07	0705086A (1-4)	DuratekK	11:17	2HR50m	Pu 4	[illegible]
5-29-07	0705098A (1-4)	ECC	1803	2HR50m	Ra	[illegible]
5-29-07	0705109A (1-4)	County Haven	1803	2HR50m	Ra	[illegible]
5-29-07	0705112A (1-4)	Duratek	1803	2HR50m	Ra	[illegible]

RA-228 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:43	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES TO 2.8-3.0- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JBarnard
5/23/07

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	07-05098
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	05/23/07 08:43	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES TO 2.8-3.0- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	05/30/07 06:22	CHEM	DJOHNSON	Filters were returned from the count room and were placed into centrifuge tubes with EDTA. LCS sample filter came from count room folded/bent not sure if this will have caused any precipitate to fall off.
3	06/04/07 09:33	CHEM	DJOHNSON	Removed filters from soaking and discarded them. Adjusted PH and added Yttrium carrier. Removed Lead interferences through two Lead Sulfide precipitations.
4	06/14/07 09:03	CHEM	DJOHNSON	Added 10mls of 18M NaOH to samples and recorded T1 time of 0650 hours for samples. Hot bathed and centrifuged samples. The supernates were discarded. Dissolved samples in 2mls of 6N HNO3. Then added 5mls of DiH2O and 3mls of 10M NaOH.
5	06/14/07 09:03	CHEM	DJOHNSON	Then vortexed, hot bathed and centrifuged samples. The supernates were discarded. Then added 2mls of 1N HNO3 and 2mls of 5% Ammonium Oxalate. Samples were vortexed, hot bathed and centrifuged. The supernates were then discarded. The precipitates were
6	06/14/07 09:03	CHEM	DJOHNSON	slurried with 5mls of DiH2O and vortexing. The samples were filtered on tarred filters. The c-tubes and funnels were rinsed with DiH2O and filtered. The filters were dried and reweighed. Mounted samples on planchets.
7	06/14/07 09:03	CHEM	DJOHNSON	Samples were covered in aluminum foil and submitted to the count room.

DJ
6/14/07

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
07-05098	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
004856P	Ammonium Hydroxide	Reagent Grade	JBARNARD	5/23/2007
005751S	EDTA	0.25M	JBARNARD	5/23/2007
005599P	Hydrofluoric Acid	Reagent Grade	JBARNARD	5/23/2007
004484D03	Lead Carrier	40 mg/ml	JBARNARD	5/23/2007
005713P	Nitric Acid	Reagent Grade	JBARNARD	5/23/2007
005486P	Perchloric Acid	Reagent Grade	JBARNARD	5/23/2007
003643S	Phenolphthalein Indicator	0.1%	JBARNARD	5/23/2007
005600P	Potassium Sulfate	Reagent Grade	JBARNARD	5/23/2007
004527P	Sulfuric Acid	Reagent Grade	JBARNARD	5/23/2007
003255D24	Barium Carrier	1 mg/ml	JBARNARD	5/23/2007
005780S	EDTA	0.25M	DJOHNSON	6/4/2007
004879P	Nitric Acid	Reagent Grade	DJOHNSON	6/4/2007
000994S	Yttrium Carrier	9 mg/ml	DJOHNSON	6/4/2007
001848D14	Lead Carrier	1.5 mg/ml	DJOHNSON	6/4/2007
004908D44	Ammonium Sulfide	2%	DJOHNSON	6/4/2007
000037D02	Ammonium Oxalate	5%	DJOHNSON	6/14/2007
005026D03	Nitric Acid	1N	DJOHNSON	6/14/2007
005700D01	Nitric Acid	6N	DJOHNSON	6/14/2007
004831D10	Sodium Hydroxide	10M	DJOHNSON	6/14/2007
003809D10	Sodium Hydroxide	18M	DJOHNSON	6/14/2007

LB4110 Red

DATE	SAMPLE #	CLIENT	LOAD TIME	CT. TIME	ANALYSIS	TECH
6-11-07	0705139RA1 (1-7)	BJC	09:34	4 HR	Ra 228	
6-11-07	0705139RA (8-15)	BJC	11:48	4 HR	Ra 228	
6-11-07	0705139RA(16,17)	BJC	13:30	4 HR	Ra 228	
6-11-07	0706009SA(1-4)	BJC	13:31	2 HR	Sr 890	
~~6-11-07~~ go 6/11/07	~~0705120AB(1)~~	~~UT-Bat~~	~~15:55~~	~~30~~	~~α/β~~	
6-11-07	0705120AB(1-4)	UT-Bat	15:58	5 min	α/β	
6-11-07	0705087SA(1)	CT	16:33	30m	Sr 90	
6-11-07	0705087SA(2-4, 6, 9)	CT	17:10	3 HR	Sr 90	
6-12-07	Daily Bkgd /QC	LABS	0605 / 0614	1HR / 30m	Bkgd / Sr 90	
6-12-07	0705138MPA (1-9)	BJC	0819	4 HR	Sr 89/90	
6-12-07	0705085RA(1)	MPA	12:50	30 min	Ra 228	
6-12-07	0705085RA(2-9)	MPA	12:52	3 HR	Ra 228	
6-12-07	0705089SA(1)	CT	14:30	30 min	Sr 90	
6-12-07	0705089SA(2-4, 6, 9, 11, 12, 17)	CT	16:16	3 HR	Sr 90	
6-12-07	0706024AB(1)	Ashland	18:35	30 min	α/β	
6-12-07	0706024AB(2-9)	Ashland	19:45	4 HR	α/β	
6-13-07	Daily Bkgd /QC	LABS	0328 / 0254	1HR / 30m	Bkgd / Sr 90	
6-13-07	0706026AB (1-6)	MPBFC	0504	30m	αβ	
6-13-07	0706042AB (1-4)	MPBFC	0507	1 HR	αβ	
6-13-07	0706063AB (1-7)	UT-Battelle	0649	3HR	αβ	
6-13-07	0705139SLC (14-17)	BJC	0829	4HR	Sr 89/90	
6-13-07	0705064RA(1-10)	MPCA	1018	3HR	Ra 228	
6-13-07	0705147SA(6-9)	BJC	12:40	3 HR	Sr 90	
6-13-07	0706058AB(1-6)	MPA	13:22	2 HR	α/β	
6-13-07	0705095SA(4-7)	PM	14:36	3HR	Sr TOT	
6-13-07	0706015CLA(15-17)	ICN	18:12	3HR	C/36	
6-14-07	Daily Bkgd /QC	LABS	0308 / 0227	1Hr / 30m	Bkgd / Sr 90	
6-14-07	0706073AB1 (1)	Dept Health	0500	30m	αβ	
6-14-07	0706073AB (2-5)	Dept Health	0500	3HR	αβ	
6-14-07	0706067AB (2-4)	Tetra Tech	0503	3HR	αβ	
6-14-07	0706067AB1 (1)	Tetra Tech	0536	30m	αβ	
6-14-07	0705120SLC (1-4)	UT-Battelle	0818	2HR	Sr 89/90	
6-14-07	0705098A (1-4)	ECC	0914	3HR	Ra	

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

Work Order	07-05098
Analysis Code	UUISO
Run	1
Date Received	5/18/2007
Lab Deadline	6/1/2007
Client	Environmental Chemical Corporation
Project	Li Tungsten
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML U-02 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	20.409
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		05/18/07 00:00	1.0000E+00
02	MBL	BLANK		05/18/07 00:00	1.0000E+00
03	DUP	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0864E+00
04	DO	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0801E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6205	12.7										
02	MBL	0.6152	12.6										
03	DUP	0.6126	12.5										
04	DO	0.6125	12.5										

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

07-05098
UUISO
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			05/23/07 08:03	JBARNARD	06/01/07 06:17	TSMITH		
02	MBL			05/23/07 08:03	JBARNARD	06/01/07 06:17	TSMITH		
03	DUP			05/23/07 08:03	JBARNARD	06/01/07 06:17	TSMITH		
04	DO	05/22/07 07:46	KSALLINGS	05/23/07 08:03	JBARNARD	06/01/07 06:17	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/g	7.47E+00	1.29E+00	1.17E-01	7.98E+00	93.68	OK		OK	
02	U-234	MBL	BLANK	pCi/g	1.08E-01	8.80E-02	1.06E-01					OK	INV
03	U-234	DUP	5601-FSS-SU5-1015	pCi/g	7.75E-01	2.25E-01	7.89E-02				OK	OK	
04	U-234	DO	5601-FSS-SU5-1015	pCi/g	9.12E-01	2.60E-01	6.22E-02					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	05/18/07 00:00	1.00E+00	93.26				6/1/2007 6:17	
02	U-234	MBL	05/18/07 00:00	1.00E+00	86.22				6/1/2007 6:17	
03	U-234	DUP	11/21/06 11:10	1.09E+00	99.05				6/1/2007 6:17	
04	U-234	DO	11/21/06 11:10	1.08E+00	101.19				6/1/2007 6:17	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	06/04/07 06:10		A_Spec	2	170.08	5.22 E+02	8.00 E-03	19.9
02	U-234	MBL	06/04/07 06:10		A_Spec	3	170.03	7.15 E+00	5.00 E-03	20.3
03	U-234	DUP	06/04/07 06:10		A_Spec	6	170	6.43 E+01	4.00 E-03	20.5
04	U-234	DO	06/04/07 06:11		A_Spec	8	170.03	6.78 E+01	1.00 E-03	18.1

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/g	2.09E-01	1.26E-01	8.18E-02	3.62E-01	57.72	INV		OK	
02	U-235	MBL	BLANK	pCi/g	3.42E-02	5.35E-02	8.65E-02					OK	INV
03	U-235	DUP	5601-FSS-SU5-1015	pCi/g	4.46E-02	5.19E-02	4.03E-02				OK	OK	
04	U-235	DO	5601-FSS-SU5-1015	pCi/g	4.41E-02	5.84E-02	9.00E-02					OK	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	05/18/07 00:00	1.00E+00	93.26				6/1/2007 6:17	
02	U-235	MBL	05/18/07 00:00	1.00E+00	86.22				6/1/2007 6:17	
03	U-235	DUP	11/21/06 11:10	1.09E+00	99.05				6/1/2007 6:17	
04	U-235	DO	11/21/06 11:10	1.08E+00	101.19				6/1/2007 6:17	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 07-05098
Client: Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	06/04/07 06:10		A_Spec	2	170.08	1.18 E+01	1.00 E-03	19.9
02	U-235	MBL	06/04/07 06:10		A_Spec	3	170.03	1.83 E+00	1.00 E-03	20.3
03	U-235	DUP	06/04/07 06:10		A_Spec	6	170	3.00 E+00	0.00 E+00	20.5
04	U-235	DO	06/04/07 06:11		A_Spec	8	170.03	2.66 E+00	2.00 E-03	18.1

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/g	7.73E+00	1.32E+00	7.73E-02	7.77E+00	99.37	OK		OK	
02	U-238	MBL	BLANK	pCi/g	2.22E-02	5.46E-02	1.28E-01					OK	INV
03	U-238	DUP	5601-FSS-SU5-1015	pCi/g	7.20E-01	2.15E-01	8.89E-02				OK	OK	
04	U-238	DO	5601-FSS-SU5-1015	pCi/g	8.41E-01	2.47E-01	6.20E-02					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	05/18/07 00:00	1.00E+00	93.26				6/1/2007 6:17	
02	U-238	MBL	05/18/07 00:00	1.00E+00	86.22				6/1/2007 6:17	
03	U-238	DUP	11/21/06 11:10	1.09E+00	99.05				6/1/2007 6:17	
04	U-238	DO	11/21/06 11:10	1.08E+00	101.19				6/1/2007 6:17	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	06/04/07 06:10		A_Spec	2	170.08	5.42 E+02	2.00 E-03	19.9
02	U-238	MBL	06/04/07 06:10		A_Spec	3	170.03	1.47 E+00	9.00 E-03	20.3
03	U-238	DUP	06/04/07 06:10		A_Spec	6	170	6.00 E+01	6.00 E-03	20.5
04	U-238	DO	06/04/07 06:11		A_Spec	8	170.03	6.28 E+01	1.00 E-03	18.1

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 07-05098
Client: Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
02	U-236	MBL	BLANK	pCi/g	8.23E-03	3.50E-02	1.01E-01					OK	INV
03	U-236	DUP	5601-FSS-SU5-1015	pCi/g	6.67E-02	6.05E-02	3.62E-02				OK	OK	
04	U-236	DO	5601-FSS-SU5-1015	pCi/g	5.71E-02	6.04E-02	6.89E-02					OK	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
02	U-236	MBL	05/18/07 00:00	1.00E+00	86.22				6/1/2007 6:17	
03	U-236	DUP	11/21/06 11:10	1.09E+00	99.05				6/1/2007 6:17	
04	U-236	DO	11/21/06 11:10	1.08E+00	101.19				6/1/2007 6:17	

1 | UUISO | 07-05098 | Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
02	U-236	MBL	06/04/07 06:10		A_Spec	3	170.03	4.90 E-01	3.00 E-03	20.3
03	U-236	DUP	06/04/07 06:10		A_Spec	6	170	5.00 E+00	0.00 E+00	20.5
04	U-236	DO	06/04/07 06:11		A_Spec	8	170.03	3.83 E+00	1.00 E-03	18.1

Count Room Report
Client: Environmental Chemical Co

07-05098-UUISO-1 (pCi/g) in SO
Tracer ID: U-10a

2-8

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	05/18/07 00:00	1.0000	0.6205	12.6638				
02	MBL	BLANK	05/18/07 00:00	1.0000	0.6152	12.5556				
03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	1.0864	0.6126	12.5026				
04	DO	5601-FSS-SU5-1015	11/21/06 11:10	1.0801	0.6125	12.5005				

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 5/23/2007 8:03 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
07-05098	1	UUISO	5/23/2007 7:59	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	*Sol #*	*Activity dpm/g*	*Solution Date*	*Approx Addition*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*
U-234	U-8a	35.240	5/23/2007	**0.500**	**0.5024**				7.98	0.287	0.00	0.000	0.00	0.000	0.00	0.000
U-235	U-8a	1.600	5/23/2007	**0.500**	**0.5024**				0.36	0.013	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	5/23/2007	**0.500**	**0.5024**				7.77	0.280	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	*Isotope*	*Sol #*	*Activity dpm/g*	*Solution Date*	*Volume Used (g)*	*Approx Addition*
01	**U-232**	U-10a	20.409	5/23/2007	**0.6205**	**0.5900**
02	**U-232**	U-10a	20.409	5/23/2007	**0.6152**	**0.5900**
03	**U-232**	U-10a	20.409	5/23/2007	**0.6126**	**0.5900**
04	**U-232**	U-10a	20.409	5/23/2007	**0.6125**	**0.5900**

Balance Printer Tapes

Tracer

0.6205 g
-0.6152 g
-0.6126 g
-0.6125 g

LCS

0.5024 g

Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

Aliquot Worksheet

Printed: 5/23/2007 8:14 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
07-05098	1	UUISO	grams	6/1/2007	JBARNARD

Lab Fraction	Environmental Chemical Corporation Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	5601-FSS-SU5-1015	DUP					1.0864E+00	1.0864E+00				
04	5601-FSS-SU5-1015	DO					1.0801E+00	1.0801E+00				

1.0864 9
1.0801 9

Comments	

Technician: [signature] Date: 5/23/07

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Printed: 5/22/2007 7:46 AM

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
07-05098	6/1/2007	5/21/2007	5/22/2007	5/23/2007	KSALLINGS

Eberline	Environmental Chemical Corporation	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	5601-FSS-SU5-1015	28.2600	1656.3000	1501.9600	1628.0400	1473.7000	9.48%	90.52%			

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sallings Date: Analysis: Rough Prep Logbook

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
4-JUN-2007 09:11:23

****

Spectral File: ND_AMS_ARCHIVE_C:C_0705098A-UU$01_UU.CNF

****

BATCH ID:	0705098A-UU	SAMPLE ID:	01
SAMPLE DATE:	4-JUN-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	SPIKE	DETECTOR NUMBER:	002
ACQ DATE:	4-JUN-2007 06:10	AVERAGE EFFICIENCY:	19.87%
ELAPSED LIVE TIME:	10205.	RECOVERY:	93.26%
TRACER ID:	UU-10A	TRACER FWHM (kev):	68.95
LAMBDA VALUE:	620.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	12.660	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	1-JUN-2007 08:23	EFF CAL DATE: 1-JUN-2007	08:23
BKG FILENAME:	B_002_1JUN07	BKG ELAPSED TIME:	60008.

****

NUCLIDE ACTIVITY SUMMARY

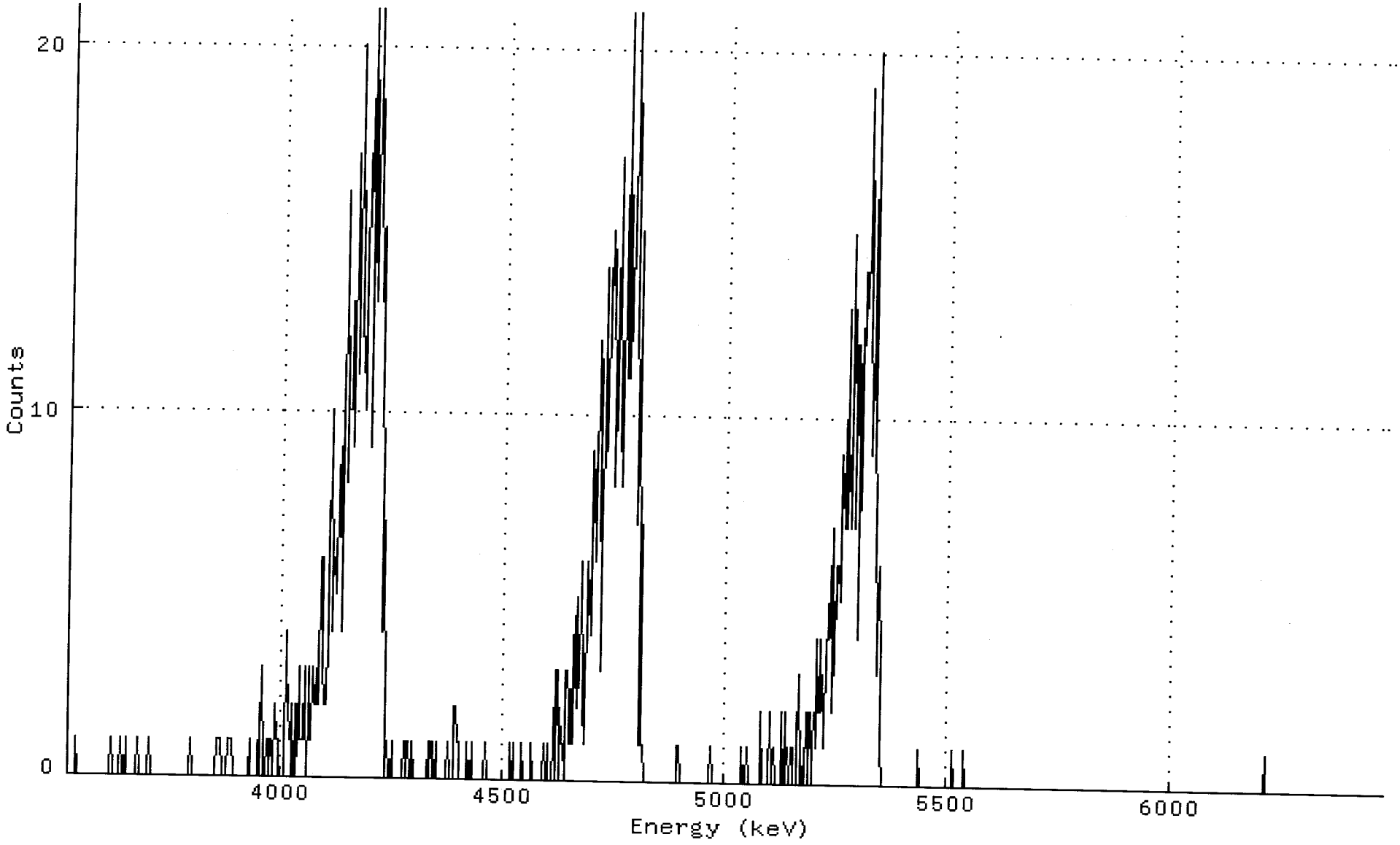
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
U232	5302.5	398.15	0.85	99.8	5.703E+00	7.443E-01	1.002E-01
U-234	4761.5	521.64	1.36	99.8	7.471E+00	1.285E+00	1.165E-01
U-235	4385.5	11.83	0.17	80.9	2.090E-01	1.264E-01	8.177E-02
U-236	4485.2	1.83	0.17	90.1	2.903E-02	4.540E-02	7.342E-02
U-238	4184.4	541.66	0.34	100.2	7.725E+00	1.322E+00	7.732E-02

****

Analyst _____ 6.4.07 Date

Reviewer _____ 6/4/07 Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0705098A-UU$01_UU.CNF;1
Title : 002
Sample Title: SPIKE
Start Time: 4-JUN-2007 06:10: Sample Time: 4-JUN-2007 00:00: Energy Offset: 3.50269E+03
Real Time : 0 02:50:05.00 Sample ID : 01 Energy Slope : 3.07781E+00
Live Time : 0 02:50:05.00 Sample Type: UU Energy Quad : -1.66734E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0705098A-UU$01_UU

Channel

1:	10205	10205	0	0	0	0	0	0	1	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	1	0	0	0	0	0	0	1
43:	0	0	0	1	0	0	0	0	0	0	0	0	1	0
57:	0	0	0	0	0	0	1	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	1	0	0	0	0
99:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	1	1	1	1	0	0	0	0	1	1	1	1	0
127:	0	0	0	0	0	0	0	0	0	0	0	0	1	0
141:	0	0	0	0	0	2	0	3	0	1	0	1	1	0
155:	1	0	0	2	1	1	0	0	0	0	0	4	3	2
169:	1	2	0	0	2	0	1	3	1	1	1	3	2	0
183:	2	3	1	3	2	2	2	4	2	6	6	3	2	2
197:	4	5	10	4	6	6	5	5	8	9	4	7	16	8
211:	10	10	10	13	9	17	11	11	20	12	12	12	10	13
225:	17	16	21	9	19	13	13	21	16	17	13	15	4	5
239:	7	1	0	1	0	0	0	1	0	0	0	0	0	0
253:	0	0	1	1	0	1	0	0	1	0	0	0	0	0
267:	0	0	0	0	0	0	1	0	1	0	1	0	1	0
281:	0	0	0	0	0	0	0	1	0	0	0	0	2	2
295:	1	1	0	0	0	0	0	0	1	0	0	1	0	0
309:	0	0	0	0	0	0	0	0	1	0	0	0	0	0
323:	0	0	0	0	0	0	0	0	0	0	0	0	0	1
337:	0	1	0	0	0	0	0	0	1	0	0	0	0	0
351:	0	1	0	0	0	0	0	0	0	0	1	1	0	1
365:	0	0	0	0	1	3	0	3	0	2	1	1	0	3
379:	3	2	1	1	4	1	4	5	2	3	5	6	2	1
393:	6	6	5	4	9	8	6	7	12	11	10	3	14	14
407:	9	14	12	15	14	10	8	11	17	15	9	12	8	16
421:	11	21	11	13	14	14	19	21	16	7	11	15	1	7
435:	1	1	0	0	0	0	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
463:	1	1	0	0	0	0	0	0	0	0	0	0	0	0
477:	0	0	0	0	0	0	0	0	0	0	0	0	1	0
491:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0	1	0	0	0	1	0
519:	0	0	0	0	0	0	0	0	0	2	0	0	0	0
533:	0	0	2	0	1	1	0	0	0	0	0	2	0	2
547:	0	1	0	0	1	1	0	0	0	1	3	0	0	0
561:	1	0	2	0	2	2	0	1	2	1	4	2	4	2
575:	3	1	1	4	4	4	6	2	7	3	6	5	6	5
589:	9	8	7	13	7	9	7	15	11	12	7	12	11	4
603:	11	14	12	14	14	19	14	9	9	12	20	9	8	3
617:	4	6	3	1	0	0	0	0	0	0	0	0	0	0
631:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
645:	0	0	0	0	0	1	0	0	0	0	0	0	0	0
659:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
673:	0	0	0	0	1	0	0	0	0	0	0	0	0	1
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
743:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	1	0	0	0	0	0	0	0	0	0	0	0
939:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0												

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Gross Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:19.79

Detector ID: 2
Live Time: 0 02:50:05.00
Batch Id: 0705098A-UU
Sample Type: UU

Acquisition Start: 4-JUN-2007 06:10:16.01
Real Time: 0 02:50:05.00
Sample Id: 01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4160.71	542	0	86.13	216.33	163	91	5.31E-02	4.3	
2	0	4376.26	12	0	7.12	288.33	263	43	1.18E-03	28.9	
3	0	4489.82	2	0	61.56	326.50	308	30	1.96E-04	70.7	
4	0	4742.63	523	0	97.32	412.06	364	82	5.12E-02	4.4	
5	0	5283.89	399	0	68.95	598.10	552	76	3.91E-02	5.0	

Background Counts Within Peak Regions Generated: 4-JUN-2007 09:11:21.66

Live Time: 0 16:40:08.00

Acquisition Start: 1-JUN-2007 20:09:37.01
Real Time: 0 16:40:08.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4139.43	2	0	157.93	208.00	163	91	3.33E-05	70.7	
2	0	4365.67	1	0	3.04	284.00	263	43	1.67E-05	100.0	
3	0	4479.74	1	0	3.04	322.50	308	30	1.67E-05	100.0	
4	0	4721.49	8	0	218.67	404.50	364	82	1.33E-04	35.4	
5	0	5260.86	5	0	0.00	589.50	552	76	8.33E-05	44.7	

Net Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:21.93

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4160.71*	542	0	86.13	216.33	163	91	5.31E-02	4.3	
2	0	4376.26*	12	0	7.12	288.33	263	43	1.16E-03	29.3	
3	0	4489.82*	2	0	61.56	326.50	308	30	1.79E-04	77.8	
4	0	4742.63*	522	0	97.32	412.06	364	82	5.11E-02	4.4	
5	0	5283.89*	398	0	68.95	598.10	552	76	3.90E-02	5.0	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 4-JUN-2007 09:11:22

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : SPIKE
Sample date : 4-JUN-2007 00:00:00
Sample ID : 01
Sample type : UU
Detector name : 002
Elapsed live time: 0 02:50:05.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 4-JUN-2007 06:10:16
Sample quantity : 1.0000 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:05.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4160.71*	542	86.13	216.33	163	91	8.6		U-238	7.20
0	4376.26*	12	7.12	288.33	263	43	58.6		U-235	0.195
0	4489.82*	2	61.56	326.50	308	301	55.7		U-236	2.708E-02
0	4742.63*	522	97.32	412.06	364	82	8.8		U-234	6.97
0	5283.89*	398	68.95	598.10	552	76	10.0		U232	5.32

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Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
4-JUN-2007 09:11:35

****

Spectral File: ND_AMS_ARCHIVE_R:R_0705098A-UU$02_UU.CNF

****

BATCH ID:	0705098A-UU	SAMPLE ID:	02
SAMPLE DATE:	4-JUN-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	BLANK	DETECTOR NUMBER:	003
ACQ DATE:	4-JUN-2007 06:10	AVERAGE EFFICIENCY:	20.31%
ELAPSED LIVE TIME:	10202.	RECOVERY:	86.22%
TRACER ID:	UU-10A	TRACER FWHM (kev):	75.64
LAMBDA VALUE:	615.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	12.552	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	1-JUN-2007 08:23	EFF CAL DATE: 1-JUN-2007	08:23
BKG FILENAME:	B_003_1JUN07	BKG ELAPSED TIME:	60004.

****

NUCLIDE ACTIVITY SUMMARY

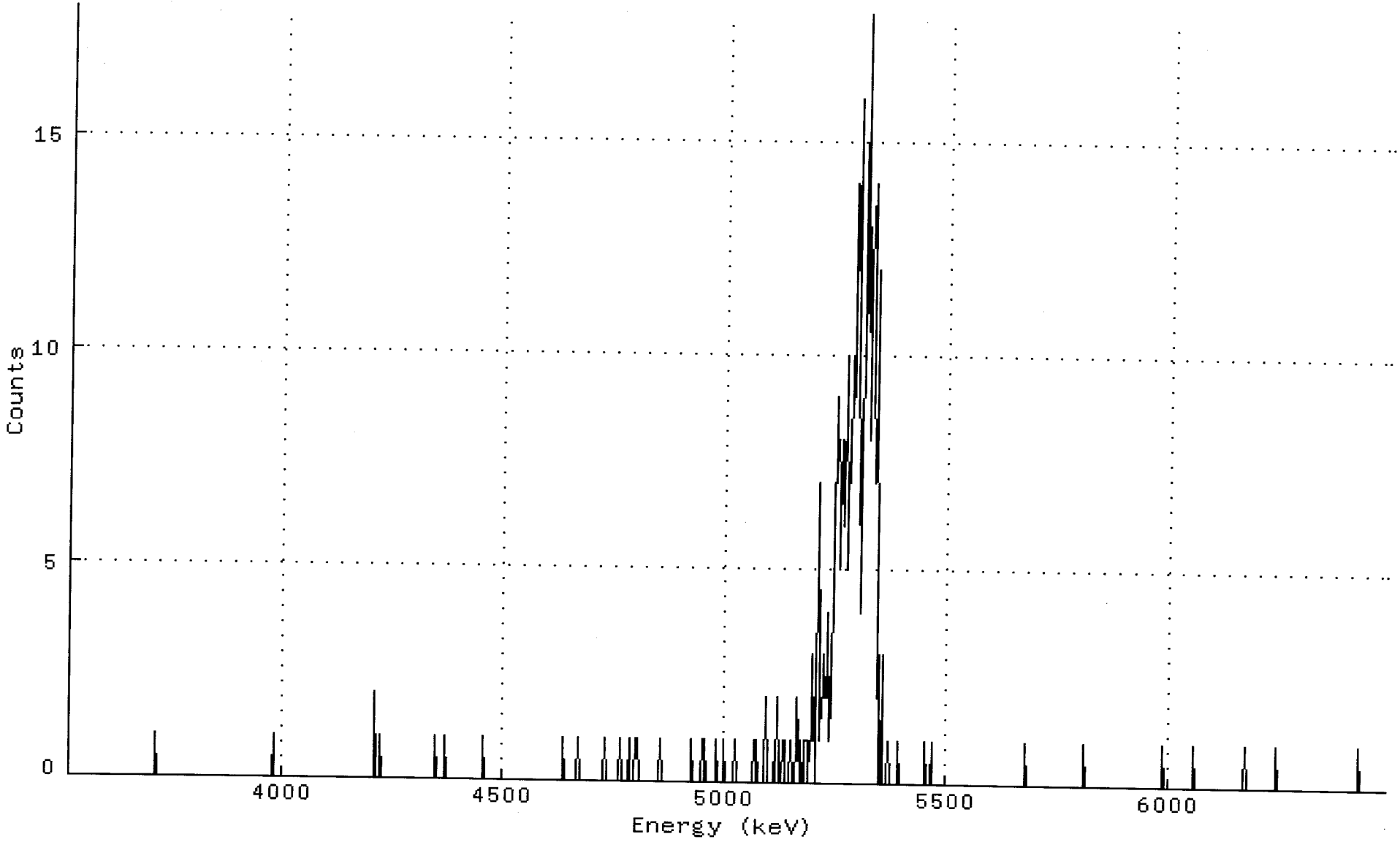
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
U232	5302.5	372.98	1.02	99.8	5.654E+00	7.525E-01	1.123E-01
U-234	4761.5	7.15	0.85	99.8	1.084E-01	8.804E-02	1.061E-01
U-235	4385.5	1.83	0.17	80.9	3.422E-02	5.352E-02	8.653E-02
U-236	4485.2	0.49	0.51	90.1	8.226E-03	3.503E-02	1.013E-01
U-238	4184.4	1.47	1.53	100.2	2.219E-02	5.461E-02	1.277E-01

****

Analyst _____ Date 6-4-07

Reviewer _____ Date 6/4/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0705098A-UU$02_UU.CNF;1
Title : 003
Sample Title: BLANK
Start Time: 4-JUN-2007 06:10: Sample Time: 4-JUN-2007 00:00: Energy Offset: 3.50114E+03
Real Time : 0 02:50:02.00 Sample ID : 02 Energy Slope : 3.08134E+00
Live Time : 0 02:50:02.00 Sample Type: UU Energy Quad : -1.61321E-04



Channel Contents for ND_AMS_ARCHIVE_R:R_0705098A-UU$02_UU

Channel

1:	10202	10202	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
253:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
295:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
323:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
351:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
365:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
379:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
393:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
407:	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
421:	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
435:	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
449:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
463:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
477:	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
491:	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
505:	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
519:	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
533:	0	0	0	0	0	1	0	2	0	0	0	0	2	0	0
547:	0	0	0	1	0	0	0	1	2	1	0	1	1	0	0
561:	1	1	1	0	1	1	3	1	2	0	7	2	1	2	
575:	2	3	2	2	4	1	2	2	5	9	7	8	7	5	
589:	8	7	6	10	5	7	7	10	9	14	12	16	9	8	
603:	4	6	12	18	11	13	8	12	13	14	10	7	10	12	
617:	2	3	0	0	3	0	0	0	0	1	0	0	0	0	
631:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
645:	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
659:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
673:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
729:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
743:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
785:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
841:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
869:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
911:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
939:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1009:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
1023:	0	0					0	0	0	0	0	0	0	0	

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Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:30.68

Detector ID: 3
Live Time: 0 02:50:02.00
Batch Id: 0705098A-UU
Sample Type: UU

Acquisition Start: 4-JUN-2007 06:10:28.01
Real Time: 0 02:50:02.00
Sample Id: 02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4214.34	3	0	3.08	234.33	163	91	2.94E-04	57.7	
2	0	4358.74	2	0	24.65	282.50	263	43	1.96E-04	70.7	
3	0	4455.75	1	0	3.08	315.00	308	30	9.80E-05	100.0	
4	0	4739.58	8	0	175.64	410.75	364	82	7.84E-04	35.4	
5	0	5285.89	374	0	75.64	597.93	551	76	3.67E-02	5.2	

Background Counts Within Peak Regions Generated: 4-JUN-2007 09:11:32.68

Live Time: 0 16:40:04.00

Acquisition Start: 1-JUN-2007 20:09:41.01
Real Time: 0 16:40:04.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4138.73	9	0	244.54	208.00	163	91	1.50E-04	33.3	
2	0	4365.99	1	0	3.06	284.00	263	43	1.67E-05	100.0	
3	0	4480.52	3	0	48.91	322.50	308	30	5.00E-05	57.7	
4	0	4723.11	5	0	177.30	404.50	364	82	8.33E-05	44.7	
5	0	5260.85	6	0	210.92	588.50	551	76	1.00E-04	40.8	

Net Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:33.02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4214.34*	1	0	3.08	234.33	163	91	1.44E-04	122.8	
2	0	4358.74*	2	0	24.65	282.50	263	43	1.79E-04	77.8	
3	0	4455.75*	0	0	3.08	315.00	308	30	4.80E-05	212.8	
4	0	4739.58*	7	0	175.64	410.75	364	82	7.01E-04	39.9	
5	0	5285.89*	373	0	75.64	597.93	551	76	3.66E-02	5.2	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 4-JUN-2007 09:11:34

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : BLANK
Sample date : 4-JUN-2007 00:00:00
Sample ID : 02
Sample type : UU
Detector name : 003
Elapsed live time: 0 02:50:02.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 4-JUN-2007 06:10:28
Sample quantity : 1.0000 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:02.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity pCi/gram
0	4214.34*	1	3.08	234.33	163	91245.7		U-238	1.913E-02
0	4358.74*	2	24.65	282.50	263	43155.7		U-235	2.951E-02
0	4455.75*	0	3.08	315.00	308	30425.6		U-236	7.093E-03
0	4739.58*	7	175.64	410.75	364	82 79.8		U-234	9.345E-02
0	5285.89*	373	75.64	597.93	551	76 10.4		U232	4.88

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ALPHA SPECTROMETRY REPORT
4-JUN-2007 09:11:46

****

Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-UU$03_UU.CNF

****

BATCH ID:	0705098A-UU	SAMPLE ID:	03
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.086E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	006
ACQ DATE:	4-JUN-2007 06:10	AVERAGE EFFICIENCY:	20.48%
ELAPSED LIVE TIME:	10200.	RECOVERY:	99.05%
TRACER ID:	UU-10A	TRACER FWHM (kev):	78.57
LAMBDA VALUE:	613.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	12.563	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	1-JUN-2007 08:23	EFF CAL DATE: 1-JUN-2007	08:23
BKG FILENAME:	B_006_1JUN07	BKG ELAPSED TIME:	60001.

****

NUCLIDE ACTIVITY SUMMARY

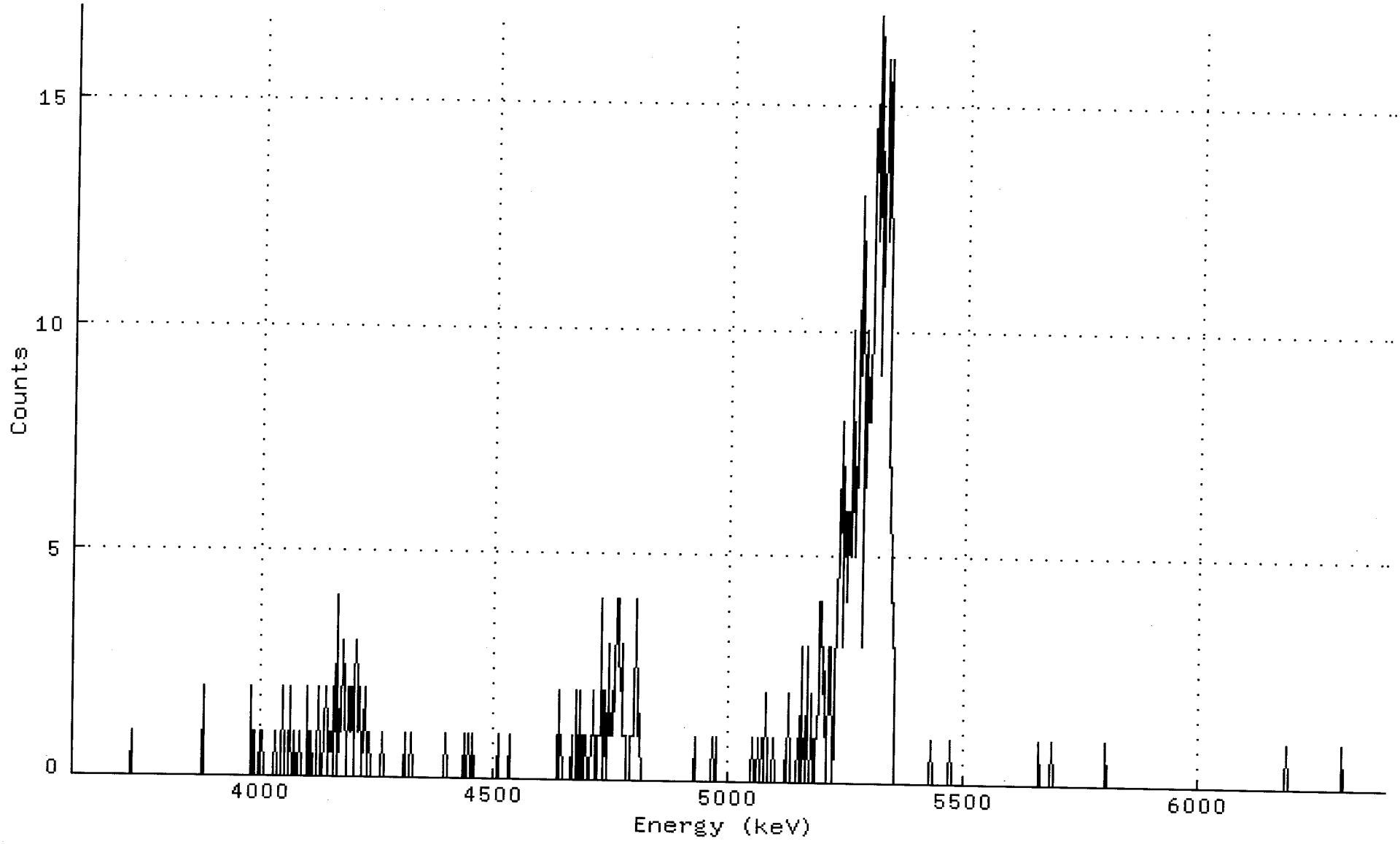
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
U232	5302.5	430.15	0.85	99.8	5.209E+00	6.645E-01	8.430E-02
U-234	4761.5	64.32	0.68	99.8	7.749E-01	2.247E-01	7.885E-02
U-235	4385.5	3.00	0.00	80.9	4.459E-02	5.189E-02	4.028E-02
U-236	4485.2	5.00	0.00	90.1	6.672E-02	6.046E-02	3.616E-02
U-238	4184.4	59.98	1.02	100.2	7.195E-01	2.148E-01	8.885E-02

****

Analyst _____ Date 6-4-07

Reviewer _____ Date 6/4/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-UU$03_UU.CNF;1
Title : 006
Sample Title: 5601-FSS-SU5-1015
Start Time: 4-JUN-2007 06:10: Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.58451E+03
Real Time : 0 02:50:00.00 Sample ID : 03 Energy Slope : 2.86392E+00
Live Time : 0 02:50:00.00 Sample Type: UU Energy Quad : -1.12671E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-UU$03_UU

Channel

1:	10200	10200	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141:	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0
155:	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
169:	1	0	0	1	0	0	0	1	0	2	0	0	0	0	2
183:	0	0	1	0	0	0	0	2	0	0	0	0	0	0	2
197:	1	0	1	1	0	2	1	4	0	1	2	1	1	1	2
211:	2	0	2	2	1	2	0	2	3	2	1	2	0	3	2
225:	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0
239:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
253:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
267:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
281:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
295:	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
337:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
351:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
365:	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
379:	0	0	0	0	0	1	0	0	0	2	0	0	2	0	0
393:	0	1	1	0	0	0	1	1	2	0	0	1	1	1	1
407:	4	0	1	2	0	3	1	1	2	1	2	4	4	3	3
421:	2	3	1	1	1	0	0	0	1	1	1	1	4	1	1
435:	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
463:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
477:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
491:	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
519:	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0
533:	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0
547:	0	0	1	0	2	0	0	0	0	0	0	1	1	0	0
561:	3	0	1	0	3	1	0	1	2	0	0	1	1	2	2
575:	4	4	2	3	2	0	0	3	3	3	0	1	2	4	4
589:	5	5	8	3	7	5	6	4	6	5	10	6	7	5	5
603:	8	13	9	12	7	3	10	8	8	8	11	14	15	12	12
617:	17	16	9	14	11	16	12	15	16	9	7	7	4	5	5
631:	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
645:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
659:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
743:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
757:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0													

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Gross Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:41.02

Detector ID: 6
Live Time: 0 02:50:00.00
Batch Id: 0705098A-UU
Sample Type: UU

Acquisition Start: 4-JUN-2007 06:10:45.01
Real Time: 0 02:50:00.00
Sample Id: 03

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4159.86	61	0	47.70	202.51	146	97	5.98E-03	12.8	
2	0	4343.95	3	0	91.65	268.00	252	46	2.94E-04	57.7	
3	0	4458.71	5	0	0.00	309.00	301	31	4.90E-04	44.7	
4	0	4748.44	65	0	78.26	413.12	360	87	6.37E-03	12.4	
5	0	5285.24	431	0	78.57	608.41	559	81	4.23E-02	4.8	

Background Counts Within Peak Regions Generated: 4-JUN-2007 09:11:44.43

Live Time: 0 16:40:01.00

Acquisition Start: 1-JUN-2007 20:09:44.01
Real Time: 0 16:40:01.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4136.57	6	0	209.38	194.00	146	97	1.00E-04	40.8	
2	0	4362.93	0	0	0.00	274.50	252	46	0.00E+00	0.0	
3	0	4479.01	0	0	0.00	316.00	301	31	0.00E+00	0.0	
4	0	4721.03	4	0	0.00	403.00	360	87	6.67E-05	50.0	
5	0	5259.60	5	0	137.67	599.00	559	81	8.33E-05	44.7	

Net Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:44.78

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4159.86*	60	0	47.70	202.51	146	97	5.88E-03	13.0	
2	0	4343.95*	3	0	91.65	268.00	252	46	2.94E-04	57.7	
3	0	4458.71*	5	0	0.00	309.00	301	31	4.90E-04	44.7	
4	0	4748.44*	64	0	78.26	413.12	360	87	6.31E-03	12.5	
5	0	5285.24*	430	0	78.57	608.41	559	81	4.22E-02	4.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 4-JUN-2007 09:11:45

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00
Sample ID : 03
Sample type : UU
Detector name : 006
Elapsed live time: 0 02:50:00.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 4-JUN-2007 06:10:45
Sample quantity : 1.0864 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:00.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4159.86*	60	47.70	202.51	146	97	26.1		U-238	0.713
0	4343.95*	3	91.65	268.00	252	46	115.5		U-235	4.416E-02
0	4458.71*	5	0.00	309.00	301	31	89.4		U-236	6.609E-02
0	4748.44*	64	78.26	413.12	360	87	25.1		U-234	0.768
0	5285.24*	430	78.57	608.41	559	81	9.7		U232	5.16

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Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
4-JUN-2007 09:11:56

Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-UU$04_UU.CNF

BATCH ID:	0705098A-UU	SAMPLE ID:	04
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.080E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	008
ACQ DATE:	4-JUN-2007 06:11	AVERAGE EFFICIENCY:	18.06%
ELAPSED LIVE TIME:	10202.	RECOVERY:	101.19%
TRACER ID:	UU-10A	TRACER FWHM (kev):	82.70
LAMBDA VALUE:	612.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	12.561	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	1-JUN-2007 08:23	EFF CAL DATE: 1-JUN-2007	08:23
BKG FILENAME:	B_008_1JUN07	BKG ELAPSED TIME:	60006.

NUCLIDE ACTIVITY SUMMARY

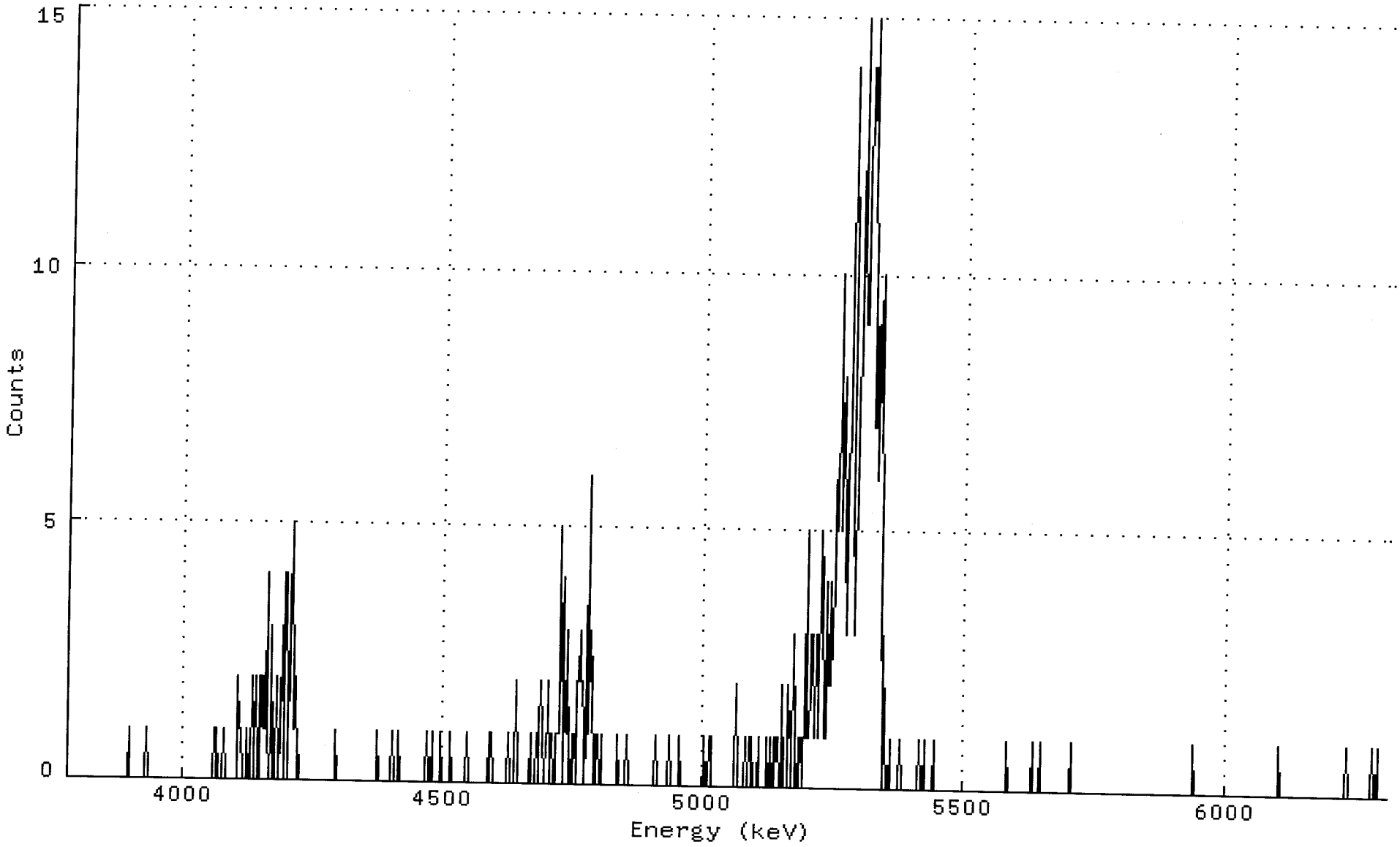
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
U232	5302.5	387.49	0.51	99.8	5.239E+00	6.897E-01	8.112E-02
U-234	4761.5	67.83	0.17	99.8	9.123E-01	2.602E-01	6.224E-02
U-235	4385.5	2.66	0.34	80.9	4.413E-02	5.840E-02	8.995E-02
U-236	4485.2	3.83	0.17	90.1	5.706E-02	6.041E-02	6.894E-02
U-238	4184.4	62.83	0.17	100.2	8.414E-01	2.469E-01	6.197E-02

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 6-4-07

Reviewer _____ Date 6/4/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-UU$04_UU.CNF;1
Title : 008
Sample Title: 5601-FSS-SU5-1015
Start Time: 4-JUN-2007 06:11: Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.76779E+03
Real Time : 0 02:50:02.00 Sample ID : 04 Energy Slope : 2.55905E+00
Live Time : 0 02:50:02.00 Sample Type: UU Energy Quad : -7.90768E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-UU$04_UU

Channel

1:	10202	10202	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0
127:	0	0	0	0	0	0	2	1	1	0	0	0	0	0	1
141:	0	1	0	2	0	1	2	0	2	0	2	1	2	1	1
155:	4	1	0	1	3	0	0	2	2	0	1	1	3	0	0
169:	4	4	1	0	3	5	1	2	2	0	0	1	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
253:	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
267:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281:	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0
295:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
323:	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0
351:	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
365:	2	1	0	0	1	1	2	0	1	1	0	0	1	1	1
379:	1	5	2	4	0	2	1	3	0	0	1	0	1	0	1
393:	2	2	3	2	2	1	0	1	6	1	3	2	2	0	0
407:	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
421:	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
435:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
449:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
463:	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
477:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
491:	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
519:	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1
533:	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1
547:	1	1	0	0	2	0	0	1	2	1	1	0	3	1	1
561:	0	0	1	0	1	0	1	1	5	1	1	2	3	3	3
575:	1	1	3	1	1	5	4	4	1	1	4	2	4	2	2
589:	3	4	6	5	8	10	5	8	7	5	3	10	8	14	14
603:	9	6	3	7	7	9	15	11	9	9	11	14	14	13	13
617:	15	7	11	7	9	6	9	10	8	5	0	3	1	0	0
631:	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
645:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
659:	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
743:	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1009:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0						1	0	0	0	0	0	0	0

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:51.83

Detector ID: 8
Live Time: 0 02:50:02.00
Batch Id: 0705098A-UU
Sample Type: UU

Acquisition Start: 4-JUN-2007 06:11:16.01
Real Time: 0 02:50:02.00
Sample Id: 04

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4171.19	63	0	51.44	158.41	91	107	6.18E-03	12.6	
2	0	4400.09	3	0	43.50	249.00	209	51	2.94E-04	57.7	
3	0	4491.33	4	0	48.62	285.25	263	35	3.92E-04	50.0	
4	0	4745.09	68	0	56.56	386.51	329	97	6.67E-03	12.1	
5	0	5284.05	388	0	82.70	603.77	549	90	3.80E-02	5.1	

Background Counts Within Peak Regions Generated: 4-JUN-2007 09:11:54.16

Live Time: 0 16:40:06.00

Acquisition Start: 1-JUN-2007 20:09:47.01
Real Time: 0 16:40:06.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4135.70	1	0	2.57	144.00	91	107	1.67E-05	100.0	
2	0	4363.94	2	0	77.09	234.00	209	51	3.33E-05	70.7	
3	0	4480.03	1	0	2.57	280.00	263	35	1.67E-05	100.0	
4	0	4723.60	1	0	2.57	377.00	329	97	1.67E-05	100.0	
5	0	5261.16	3	0	23.13	593.50	549	90	5.00E-05	57.7	

Net Sample Counts Within Peak Regions Generated: 4-JUN-2007 09:11:54.52

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4171.19*	63	0	51.44	158.41	91	107	6.16E-03	12.6	
2	0	4400.09*	3	0	43.50	249.00	209	51	2.61E-04	65.7	
3	0	4491.33*	4	0	48.62	285.25	263	35	3.75E-04	52.4	
4	0	4745.09*	68	0	56.56	386.51	329	97	6.65E-03	12.2	
5	0	5284.05*	387	0	82.70	603.77	549	90	3.80E-02	5.1	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 4-JUN-2007 09:11:55

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00 Acquisition date : 4-JUN-2007 06:11:16
Sample ID : 04 Sample quantity : 1.0801 gram
Sample type : UU Sample geometry :
Detector name : 008 Detector geometry:
Elapsed live time: 0 02:50:02.00 Elapsed real time: 0 02:50:02.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4171.19*	63	51.44	158.41	91	107	25.3		U-238	0.851
0	4400.09*	3	43.50	249.00	209	51131.5			U-235	4.466E-02
0	4491.33*	4	48.62	285.25	263	35104.8			U-236	5.774E-02
0	4745.09*	68	56.56	386.51	329	97	24.3		U-234	0.923
0	5284.05*	387	82.70	603.77	549	90	10.2		U232	5.30

Review of QA results (Daily Pulser Check) 4-JUN-2007 05:57:12 Page 1

Detector	Parameter	Flag	Filename
1	ALL	Passed	D_001_NONE
2	ALL	Passed	D_002_NONE
3	ALL	Passed	D_003_NONE
4	OFFLINE		
5	OFFLINE		
6	ALL	Passed	D_006_NONE
7	OFFLINE		
8	ALL	Passed	D_008_NONE
9	ALL	Passed	D_009_NONE
10	ALL	Passed	D_010_NONE
11	ALL	Passed	D_011_NONE
12	ALL	Passed	D_012_NONE
13	ALL	Passed	D_013_NONE
14	ALL	Passed	D_014_NONE
15	OFFLINE		
16	ALL	Passed	D_016_NONE
17	ALL	Passed	D_017_NONE
18	ALL	Passed	D_018_NONE
19	ALL	Passed	D_019_NONE
20	OFFLINE		
21	OFFLINE		
22	OFFLINE		
23	ALL	Passed	D_023_NONE
24	OFFLINE		
25	ALL	Passed	D_025_NONE
26	ALL	Passed	D_026_NONE
27	ALL	Passed	D_027_NONE
28	ALL	Passed	D_028_NONE
29	ALL	Passed	D_029_NONE
30	ALL	Passed	D_030_NONE
31	ALL	Passed	D_031_NONE
32	OFFLINE		
33	ALL	Passed	D_033_NONE
34	ALL	Passed	D_034_NONE
35	OFFLINE		
36	OFFLINE		
37	ALL	Passed	D_037_NONE
38	ALL	Passed	D_038_NONE
39	OFFLINE		
40	OFFLINE		
41	ALL	Passed	D_041_NONE
42	ALL	Passed	D_042_NONE
43	OFFLINE		
44	OFFLINE		
45	ALL	Passed	D_045_NONE
46	ALL	Passed	D_046_NONE
47	ALL	Passed	D_047_NONE
48	ALL	Passed	D_048_NONE

APPROVAL DATE: 6.4.07 APPROVAL TIME: _____

APPROVED BY: _____ PROCEDURE # _____

SECTION IX

ANALYTICAL DATA (ISOTOPIC THORIUM)

07-05098
ThISO
Run 1

Work Order	07-05098
Analysis Code	ThISO
Run	1
Date Received	5/18/2007
Lab Deadline	6/1/2007
Client	Environmental Chemical Corporation
Project	Li Tungsten
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML Th-01 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Th-229
Radiometric Sol#	Th-18a
Tracer Act (dpm/g)	22.478
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		05/18/07 00:00	1.0000E+00
02	MBL	BLANK		05/18/07 00:00	1.0000E+00
03	DUP	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0826E+00
04	DO	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0050E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.2326	5.2										
02	MBL	0.2297	5.2										
03	DUP	0.2287	5.1										
04	DO	0.2295	5.2										

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			05/23/07 07:58	JBARNARD	05/31/07 06:15	TSMITH		
02	MBL			05/23/07 07:58	JBARNARD	05/31/07 06:15	TSMITH		
03	DUP			05/23/07 07:58	JBARNARD	05/31/07 06:15	TSMITH		
04	DO	05/22/07 07:46	KSALLINGS	05/23/07 07:58	JBARNARD	05/31/07 06:15	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	TH-228	LCS	LCS	pCi/g	4.15E+00	8.86E-01	7.21E-02	4.79E+00	86.77	OK		OK	
02	TH-228	MBL	BLANK	pCi/g	-1.85E-02	1.45E-02	1.21E-01					OK	INV
03	TH-228	DUP	5601-FSS-SU5-1015	pCi/g	1.69E+00	4.85E-01	1.45E-01				INV	OK	
04	TH-228	DO	5601-FSS-SU5-1015	pCi/g	1.33E+00	4.04E-01	1.22E-01					OK	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	TH-228	LCS	05/18/07 00:00	1.00E+00	106.74				5/31/2007 6:15	
02	TH-228	MBL	05/18/07 00:00	1.00E+00	87.44				5/31/2007 6:15	
03	TH-228	DUP	11/21/06 11:10	1.08E+00	86.95				5/31/2007 6:15	
04	TH-228	DO	11/21/06 11:10	1.01E+00	90.24				5/31/2007 6:15	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-228	LCS	05/31/07 08:09		A_Spec	1	170.07	3.48 E+02	3.00 E-03	20.8
02	TH-228	MBL	05/31/07 08:09		A_Spec	2	170.12	-1.19 E+00	7.00 E-03	19.5
03	TH-228	DUP	05/31/07 08:09		A_Spec	3	170.02	9.75 E+01	1.50 E-02	19.7
04	TH-228	DO	05/31/07 08:10		A_Spec	6	170.03	7.65 E+01	9.00 E-03	20.3

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	TH-230	LCS	LCS	pCi/g	4.68E+00	9.84E-01	7.83E-02	5.34E+00	87.71	OK		OK	
02	TH-230	MBL	BLANK	pCi/g	6.99E-02	7.16E-02	9.39E-02					OK	INV
03	TH-230	DUP	5601-FSS-SU5-1015	pCi/g	1.00E+00	3.15E-01	1.06E-01				OK	OK	
04	TH-230	DO	5601-FSS-SU5-1015	pCi/g	1.20E+00	3.55E-01	8.69E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	TH-230	LCS	05/18/07 00:00	1.00E+00	106.74				5/31/2007 6:15	
02	TH-230	MBL	05/18/07 00:00	1.00E+00	87.44				5/31/2007 6:15	
03	TH-230	DUP	11/21/06 11:10	1.08E+00	86.95				5/31/2007 6:15	
04	TH-230	DO	11/21/06 11:10	1.01E+00	90.24				5/31/2007 6:15	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-230	LCS	05/31/07 08:09		A_Spec	1	170.07	3.91 E+02	4.00 E-03	20.8
02	TH-230	MBL	05/31/07 08:09		A_Spec	2	170.12	4.49 E+00	3.00 E-03	19.5
03	TH-230	DUP	05/31/07 08:09		A_Spec	3	170.02	7.00 E+01	6.00 E-03	19.7
04	TH-230	DO	05/31/07 08:10		A_Spec	6	170.03	8.35 E+01	3.00 E-03	20.3

Run: 1
Analysis Code: ThISO
Eberline Services Work Order: 07-05098
Client: Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	TH-232	LCS	LCS	pCi/g	3.81E+00	8.22E-01	8.84E-02	4.79E+00	79.56	OK		OK	
02	TH-232	MBL	BLANK	pCi/g	-5.29E-03	7.55E-03	8.42E-02					OK	INV
03	TH-232	DUP	5601-FSS-SU5-1015	pCi/g	1.17E+00	3.51E-01	1.16E-01				OK	OK	
04	TH-232	DO	5601-FSS-SU5-1015	pCi/g	1.12E+00	3.38E-01	1.07E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	TH-232	LCS	05/18/07 00:00	1.00E+00	106.74				5/31/2007 6:15	
02	TH-232	MBL	05/18/07 00:00	1.00E+00	87.44				5/31/2007 6:15	
03	TH-232	DUP	11/21/06 11:10	1.08E+00	86.95				5/31/2007 6:15	
04	TH-232	DO	11/21/06 11:10	1.01E+00	90.24				5/31/2007 6:15	

Run: 1
Analysis Code: ThISO
Eberline Services Work Order: 07-05098
Client: Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-232	LCS	05/31/07 08:09		A_Spec	1	170.07	3.19 E+02	6.00 E-03	20.8
02	TH-232	MBL	05/31/07 08:09		A_Spec	2	170.12	-3.40 E-01	2.00 E-03	19.5
03	TH-232	DUP	05/31/07 08:09		A_Spec	3	170.02	8.16 E+01	8.00 E-03	19.7
04	TH-232	DO	05/31/07 08:10		A_Spec	6	170.03	7.80 E+01	6.00 E-03	20.3

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
02	TH-227	MBL	BLANK	pCi/g	4.75E-02	6.58E-02	1.18E-01					OK	INV
03	TH-227	DUP	5601-FSS-SU5-1015	pCi/g	4.92E-02	6.93E-02	1.29E-01				INV	OK	
04	TH-227	DO	5601-FSS-SU5-1015	pCi/g	7.98E-02	7.58E-02	9.66E-02					OK	

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
02	TH-227	MBL	05/18/07 00:00	1.00E+00	87.44				5/31/2007 6:15	
03	TH-227	DUP	11/21/06 11:10	1.08E+00	86.95				5/31/2007 6:15	
04	TH-227	DO	11/21/06 11:10	1.01E+00	90.24				5/31/2007 6:15	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-ThISO-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: ThISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
02	TH-227	MBL	05/31/07 08:09		A_Spec	2	170.12	2.98 E+00	6.00 E-03	19.5
03	TH-227	DUP	05/31/07 08:09		A_Spec	3	170.02	3.30 E+00	1.00 E-02	19.7
04	TH-227	DO	05/31/07 08:10		A_Spec	6	170.03	5.32 E+00	4.00 E-03	20.3

Count Room Report
Client: Environmental Chemical Co

07-05098-ThISO-1 (pCi/g) in SO
Tracer ID: Th-18a

16

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	05/18/07 00:00	1.0000	0.2326	5.2284				
02	MBL	BLANK	05/18/07 00:00	1.0000	0.2297	5.1632				
03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	1.0826	0.2287	5.1407				
04	DO	5601-FSS-SU5-1015	11/21/06 11:10	1.0050	0.2295	5.1587				

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 5/23/2007 7:58 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
07-05098	1	ThISO	5/23/2007 7:54	JBARNARD		

LCS & Matrix Spikes

					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Th-228	Th-8b	103.560	5/23/2007	**0.100**	**0.1026**				4.79	0.172	0.00	0.000	0.00	0.000	0.00	0.000
Th-230	Th-1b	23.527	5/23/2007	**0.500**	**0.5035**				5.34	0.144	0.00	0.000	0.00	0.000	0.00	0.000
Th-232	Th-8b	103.560	5/23/2007	**0.100**	**0.1026**				4.79	0.172	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	**Th-229**	Th-18a	22.478	5/23/2007	**0.2326**	**0.4600**
02	**Th-229**	Th-18a	22.478	5/23/2007	**0.2297**	**0.4600**
03	**Th-229**	Th-18a	22.478	5/23/2007	**0.2287**	**0.4600**
04	**Th-229**	Th-18a	22.478	5/23/2007	**0.2295**	**0.4600**

Balance Printer Tapes

Tracer

0.2326 g
-0.2297 g
-0.2287 g
-0.2295 g

LCS

0.5035 g
0.1026 g

Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

Aliquot Worksheet

Printed: 5/23/2007 8:11 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
07-05098	1	ThISO	grams	6/1/2007	JBARNARD

Lab Fraction	Environmental Chemical Corporation Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	5601-FSS-SU5-1015	DUP					1.0826E+00	1.0826E+00				
04	5601-FSS-SU5-1015	DO					1.0050E+00	1.0050E+00				

Comments	

1.0826 g
1.0050 g

Technician: _____ Date: 5/23/07

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Printed: 5/22/2007 7:46 AM

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
07-05098	6/1/2007	5/21/2007	5/22/2007	5/23/2007	KSALLINGS

Eberline	Environmental Chemical Corporation	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	5601-FSS-SU5-1015	28.2600	1656.3000	1501.9600	1628.0400	1473.7000	9.48%	90.52%			

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sallings Date:

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
31-MAY-2007 11:20:06

Spectral File: ND_AMS_ARCHIVE_C:C_0705098A-TH$01_TH.CNF

BATCH ID:	0705098A-TH	SAMPLE ID:	01
SAMPLE DATE:	31-MAY-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	SPIKE	DETECTOR NUMBER:	001
ACQ DATE:	31-MAY-2007 08:09	AVERAGE EFFICIENCY:	20.79%
ELAPSED LIVE TIME:	10204.	RECOVERY:	106.74%
TRACER ID:	TH-18A	TRACER FWHM (kev):	203.36
LAMBDA VALUE:	233.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	5.228	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE:	25-MAY-2007 07:39
BKG FILENAME:	B_001_25MAY07	BKG ELAPSED TIME:	60004.

NUCLIDE ACTIVITY SUMMARY

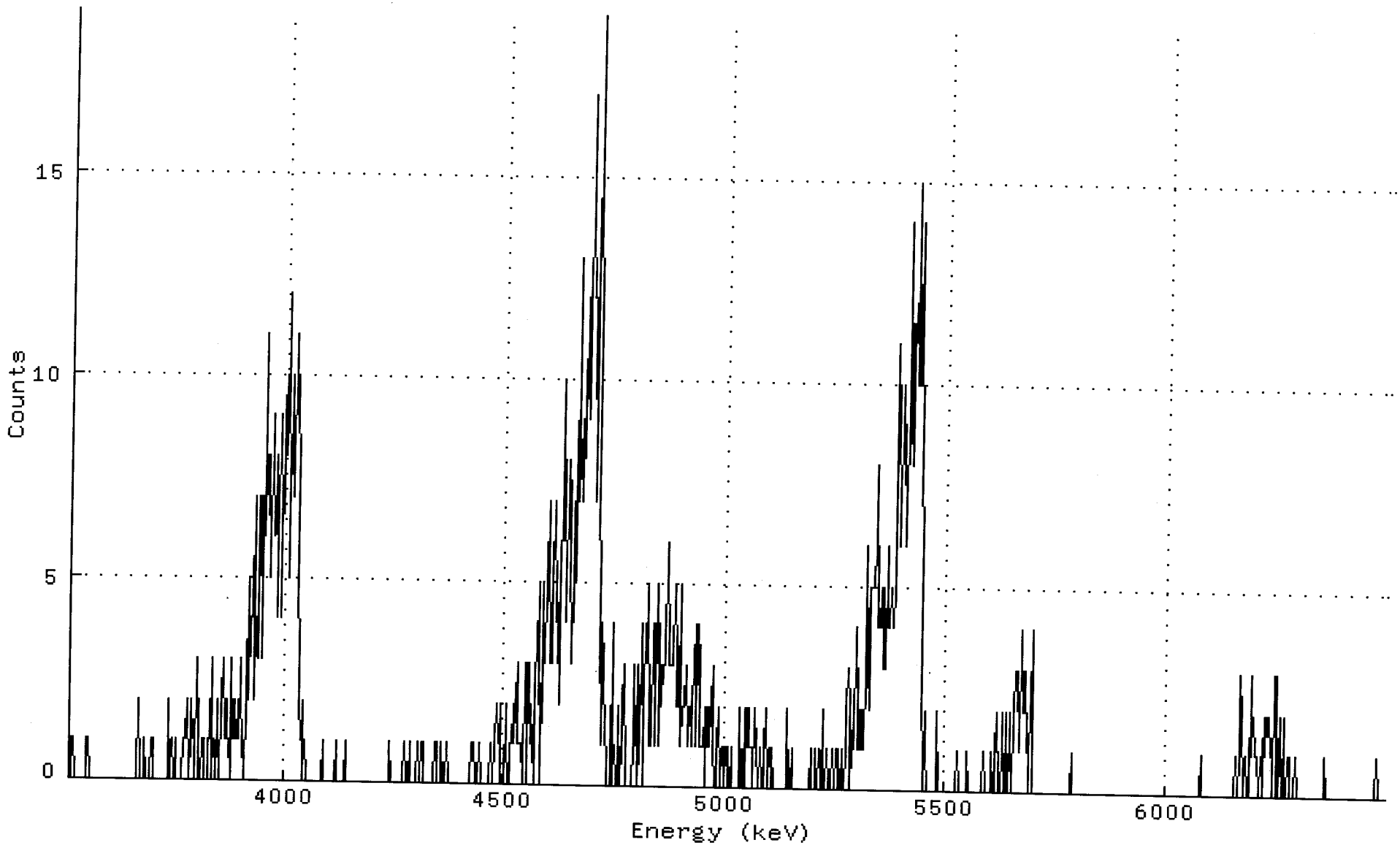
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
TH-227	5850.0	-1.04	2.04	97.5	-1.274E-02	2.852E-02	1.145E-01
TH-228	5400.0	347.49	0.51	99.9	4.153E+00	8.858E-01	7.205E-02
TH229	4872.0	196.32	0.68	99.5	2.355E+00	4.020E-01	7.852E-02
TH-230	4672.0	391.32	0.68	99.8	4.680E+00	9.841E-01	7.828E-02
TH-232	3997.0	318.98	1.02	100.0	3.808E+00	8.217E-01	8.843E-02

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 5.31.07

Reviewer _____ Date 5/31/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0705098A-TH$01_TH.CNF;1
Title : 001
Sample Title: SPIKE
Start Time: 31-MAY-2007 08:09 Sample Time: 31-MAY-2007 00:00 Energy Offset: 3.49784E+03
Real Time : 0 02:50:04.00 Sample ID : 01 Energy Slope : 3.08052E+00
Live Time : 0 02:50:04.00 Sample Type: TH Energy Quad : -1.49306E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0705098A-TH$01_TH

Channel

1:	10204	10204	0	0	1	1	0	0	0	0	0	0	0	0	0
15:	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
57:	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0
71:	0	0	0	0	0	0	0	2	0	1	1	0	1	0	0
85:	0	0	0	0	1	1	1	2	0	1	2	1	1	0	0
99:	3	1	0	0	1	1	0	0	0	1	1	3	0	1	0
113:	0	2	1	0	2	2	3	1	2	1	1	0	3	1	0
127:	1	2	1	1	3	2	1	0	0	2	5	2	4	4	0
141:	7	2	4	3	7	7	3	11	6	8	7	8	5	9	0
155:	8	6	8	4	6	9	6	4	9	10	8	12	5	10	0
169:	10	7	11	11	9	8	6	2	1	2	0	1	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
197:	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
211:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
253:	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
267:	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
281:	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
295:	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
309:	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0
323:	0	1	2	2	1	2	0	0	0	2	1	0	0	1	0
337:	1	2	1	2	3	1	1	1	1	0	3	3	0	3	0
351:	1	2	1	0	2	4	2	5	0	3	5	3	5	7	0
365:	6	3	3	5	7	4	5	3	6	2	10	6	8	4	0
379:	8	7	6	3	5	7	5	13	7	8	9	7	9	12	0
393:	10	9	17	14	12	12	7	10	19	7	8	4	1	4	0
407:	3	1	2	0	0	0	0	4	0	1	0	0	2	0	0
421:	1	2	3	0	0	0	0	0	0	1	3	1	3	0	0
435:	1	4	0	2	4	4	5	1	1	1	4	4	1	5	0
449:	1	4	2	3	3	3	6	6	3	3	3	3	5	3	0
463:	2	2	5	1	2	2	2	3	1	1	2	1	2	3	0
477:	4	1	4	3	1	1	1	2	0	2	2	1	2	3	0
491:	1	0	0	1	2	0	0	1	1	0	1	0	1	0	0
505:	1	0	0	0	0	0	0	2	0	0	2	0	2	2	0
519:	1	1	1	0	2	1	1	0	1	1	0	0	1	2	0
533:	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
547:	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0
575:	0	2	0	0	1	1	0	0	0	1	0	0	1	0	0
589:	1	0	1	0	0	1	2	3	2	0	1	2	1	4	0
603:	1	3	1	2	1	1	3	6	3	2	5	5	5	6	0
617:	8	4	4	4	5	3	5	3	6	4	4	5	5	4	0
631:	5	11	9	7	6	10	8	9	6	10	14	9	8	11	0
645:	12	10	15	10	14	10	10	4	3	0	2	1	0	0	0
659:	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
687:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	1	0	0	0	0	0	0	1	0	0	1	2	0	0
715:	1	0	1	2	0	0	2	0	2	1	0	2	2	3	0
729:	3	3	1	4	4	2	3	2	2	0	1	2	4	0	0
743:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	1	0	0	1	3	2	0	0	0
911:	1	0	0	0	3	1	2	1	1	1	0	0	1	0	0
925:	1	2	1	2	2	2	1	1	0	3	0	3	0	2	0
939:	1	0	2	0	0	0	1	1	0	0	0	0	1	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
1023:	0	0													

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:02.68

Detector ID: 1
Live Time: 0 02:50:04.00
Batch Id: 0705098A-TH
Sample Type: TH
Acquisition Start: 31-MAY-2007 08:09:17.01
Real Time: 0 02:50:04.00
Sample Id: 01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3967.35	320	0105.63	153.56	99	99	3.14E-02	5.6	
2	0	4645.99	392	0 82.71	379.70	305	102	3.84E-02	5.1	
3	0	4891.05	197	0203.36	462.64	407	128	1.93E-02	7.1	
4	0	5380.39	348	0106.79	630.38	551	104	3.41E-02	5.4	
5	0	5789.86	1	0 3.08	773.00	742	124	9.80E-05	100.0	

Background Counts Within Peak Regions Generated: 31-MAY-2007 11:20:04.44

Live Time: 0 16:40:04.00
Acquisition Start: 25-MAY-2007 18:09:47.01
Real Time: 0 16:40:04.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3950.83	6	0289.15	148.00	99	99	1.00E-04	40.8	
2	0	4573.61	4	0 89.21	355.50	305	102	6.67E-05	50.0	
3	0	4913.26	4	0181.49	470.50	407	128	6.67E-05	50.0	
4	0	5298.28	3	0 0.00	602.50	551	104	5.00E-05	57.7	
5	0	5874.62	12	0 0.00	803.50	742	124	2.00E-04	28.9	

Net Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:04.79

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3967.35*	319	0105.63	153.56	99	99	3.13E-02	5.6	
2	0	4645.99*	391	0 82.71	379.70	305	102	3.83E-02	5.1	
3	0	4891.05*	196	0203.36	462.64	407	128	1.92E-02	7.2	
4	0	5380.39*	347	0106.79	630.38	551	104	3.41E-02	5.4	
5	0	5789.86*	-1	0 3.08	773.00	742	124	-1.02E-04	111.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 31-MAY-2007 11:20:05

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : SPIKE
Sample date : 31-MAY-2007 00:00:00 Acquisition date : 31-MAY-2007 08:09:17
Sample ID : 01 Sample quantity : 1.0000 gram
Sample type : TH Sample geometry :
Detector name : 001 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:04.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	3967.35*	319105.63	153.56	99	99	11.2			TH-232	4.06
0	4645.99*	391 82.71	379.70	305	102	10.1			TH-230	5.00
0	4891.05*	196203.36	462.64	407	128	14.3			TH229	2.51
0	5380.39*	347106.79	630.38	551	104	10.7			TH-228	4.43
0	5789.86*	-1 3.08	773.00	742	124	223.1			TH-227	-1.360E-02

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
31-MAY-2007 11:20:17

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Spectral File: ND_AMS_ARCHIVE_R:R_0705098A-TH$02_TH.CNF

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BATCH ID:	0705098A-TH	SAMPLE ID:	02
SAMPLE DATE:	31-MAY-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	BLANK	DETECTOR NUMBER:	002
ACQ DATE:	31-MAY-2007 08:09	AVERAGE EFFICIENCY:	19.49%
ELAPSED LIVE TIME:	10207.	RECOVERY:	87.44%
TRACER ID:	TH-18A	TRACER FWHM (kev):	140.56
LAMBDA VALUE:	230.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	5.163	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE:	25-MAY-2007 07:39
BKG FILENAME:	B_002_25MAY07	BKG ELAPSED TIME:	60000.

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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
TH-227	5850.0	2.98	1.02	97.5	4.748E-02	6.581E-02	1.180E-01
TH-228	5400.0	-1.19	1.19	99.9	-1.852E-02	1.449E-02	1.210E-01
TH229	4872.0	148.98	1.02	99.5	2.326E+00	4.398E-01	1.156E-01
TH-230	4672.0	4.49	0.51	99.8	6.988E-02	7.161E-02	9.388E-02
TH-232	3997.0	-0.34	0.34	100.0	-5.286E-03	7.551E-03	8.424E-02

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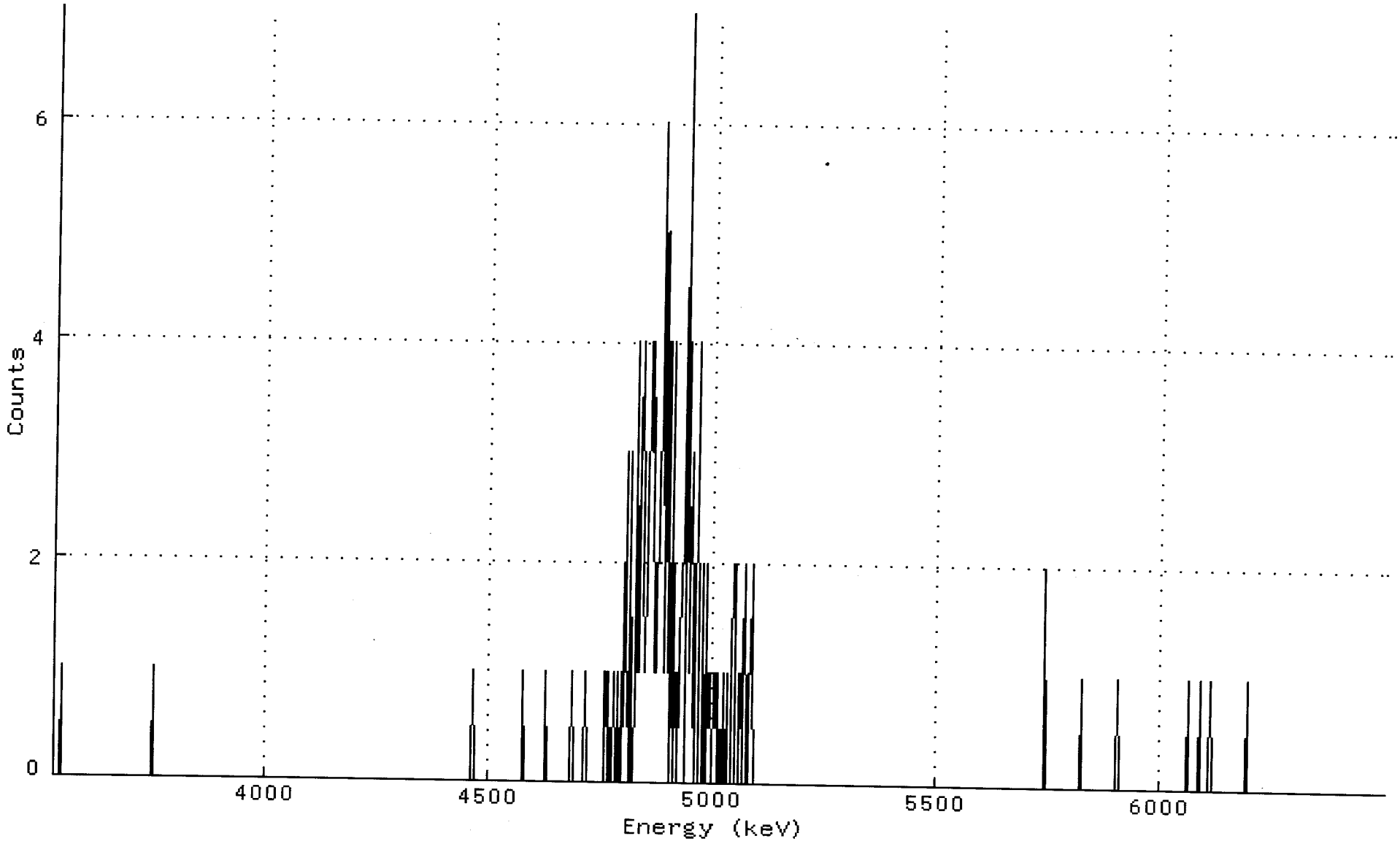
*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 5-31-07

Reviewer _____ Date 5/31/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0705098A-TH$02_TH.CNF;1
Title : 002
Sample Title: BLANK
Start Time: 31-MAY-2007 08:09 Sample Time: 31-MAY-2007 00:00 Energy Offset: 3.51300E+03
Real Time : 0 02:50:07.00 Sample ID : 02 Energy Slope : 3.03709E+00
Live Time : 0 02:50:07.00 Sample Type: TH Energy Quad : -1.22320E-04



Channel Contents for ND_AMS_ARCHIVE_R:R_0705098A-TH$02_TH

Channel

1:	10207	10207	0	0	0	0	0	1	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
253:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
351:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
365:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
379:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
393:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
407:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
421:	1	0	0	0	1	0	1	0	0	1	0	1	1	1	0
435:	1	0	3	0	0	1	4	1	1	3	4	2	2	3	1
449:	2	2	4	3	4	3	1	1	2	2	4	6	4	1	1
463:	5	3	1	4	0	1	4	0	1	1	0	1	2	0	2
477:	2	7	0	4	1	1	3	1	1	0	4	0	0	1	0
491:	0	2	0	2	0	1	1	1	0	1	1	1	0	1	0
505:	0	0	1	0	0	1	0	0	1	1	2	2	0	0	0
519:	0	1	1	0	1	2	0	0	1	1	2	1	0	0	0
533:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
547:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
575:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
589:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
603:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
631:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
645:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
659:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
743:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0													

Eberline Services
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Gross Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:13.72

Detector ID: 02
Live Time: 0 02:50:07.00
Batch Id: 0705098A-TH
Sample Type: TH

Acquisition Start: 31-MAY-2007 08:09:30.01
Real Time: 0 02:50:07.00
Sample Id: 02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3950.81	0	0	0.00	145.00	95	101	0.00E+00	0.0	
2	0	4615.86	5	0	261.19	368.60	304	103	4.90E-04	44.7	
3	0	4908.10	150	0	140.56	468.18	406	129	1.47E-02	8.2	
4	0	5299.89	0	0	0.00	603.00	551	105	0.00E+00	0.0	
5	0	5801.11	4	0	3.04	777.75	742	125	3.92E-04	50.0	

Background Counts Within Peak Regions Generated: 31-MAY-2007 11:20:15.68

Live Time: 0 16:40:00.00

Acquisition Start: 25-MAY-2007 18:09:50.01
Real Time: 0 16:40:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3946.80	2	0	176.65	145.00	95	101	3.33E-05	70.7	
2	0	4572.82	3	0	82.23	355.00	304	103	5.00E-05	57.7	
3	0	4910.82	6	0	335.02	470.00	406	129	1.00E-04	40.8	
4	0	5297.45	7	0	3.05	603.00	551	105	1.17E-04	37.8	
5	0	5873.09	6	0	3.05	804.00	742	125	1.00E-04	40.8	

Net Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:15.97

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3950.81*	0	0	0.00	145.00	95	101	-3.33E-05	70.7	
2	0	4615.86*	4	0	261.19	368.60	304	103	4.40E-04	50.2	
3	0	4908.10*	149	0	140.56	468.18	406	129	1.46E-02	8.2	
4	0	5299.89*	-1	0	0.00	603.00	551	105	-1.17E-04	37.8	
5	0	5801.11*	3	0	3.04	777.75	742	125	2.92E-04	68.6	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 31-MAY-2007 11:20:16

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : BLANK
Sample date : 31-MAY-2007 00:00:00
Sample ID : 02
Sample type : TH
Detector name : 002
Elapsed live time: 0 02:50:07.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 31-MAY-2007 08:09:30
Sample quantity : 1.0000 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:07.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	3950.81*	0	0.00	145.00	95	101	141.4		TH-232	-4.622E-03
0	4615.86*	4261	9.19	368.60	304	103	100.5		TH-230	6.110E-02
0	4908.10*	149140	0.56	468.18	406	129	16.5		TH229	2.03
0	5299.89*	-1	0.00	603.00	551	105	75.6		TH-228	-1.619E-02
0	5801.11*	3	3.04	777.75	742	125	137.1		TH-227	4.151E-02

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
31-MAY-2007 11:20:27

****

Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-TH$03_TH.CNF

****

BATCH ID:	0705098A-TH	SAMPLE ID:	03
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.083E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	003
ACQ DATE:	31-MAY-2007 08:09	AVERAGE EFFICIENCY:	19.70%
ELAPSED LIVE TIME:	10201.	RECOVERY:	86.95%
TRACER ID:	TH-18A	TRACER FWHM (kev):	97.82
LAMBDA VALUE:	229.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	5.141	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE:	25-MAY-2007 07:39
BKG FILENAME:	B_003_25MAY07	BKG ELAPSED TIME:	60005.

****

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
TH-227	5850.0	3.30	1.70	97.5	4.917E-02	6.925E-02	1.286E-01
TH-228	5400.0	97.45	2.55	99.9	1.685E+00	4.850E-01	1.449E-01
TH229	4872.0	148.98	1.02	99.5	2.139E+00	4.045E-01	1.063E-01
TH-230	4672.0	69.98	1.02	99.8	1.002E+00	3.148E-01	1.060E-01
TH-232	3997.0	81.64	1.36	100.0	1.166E+00	3.510E-01	1.162E-01

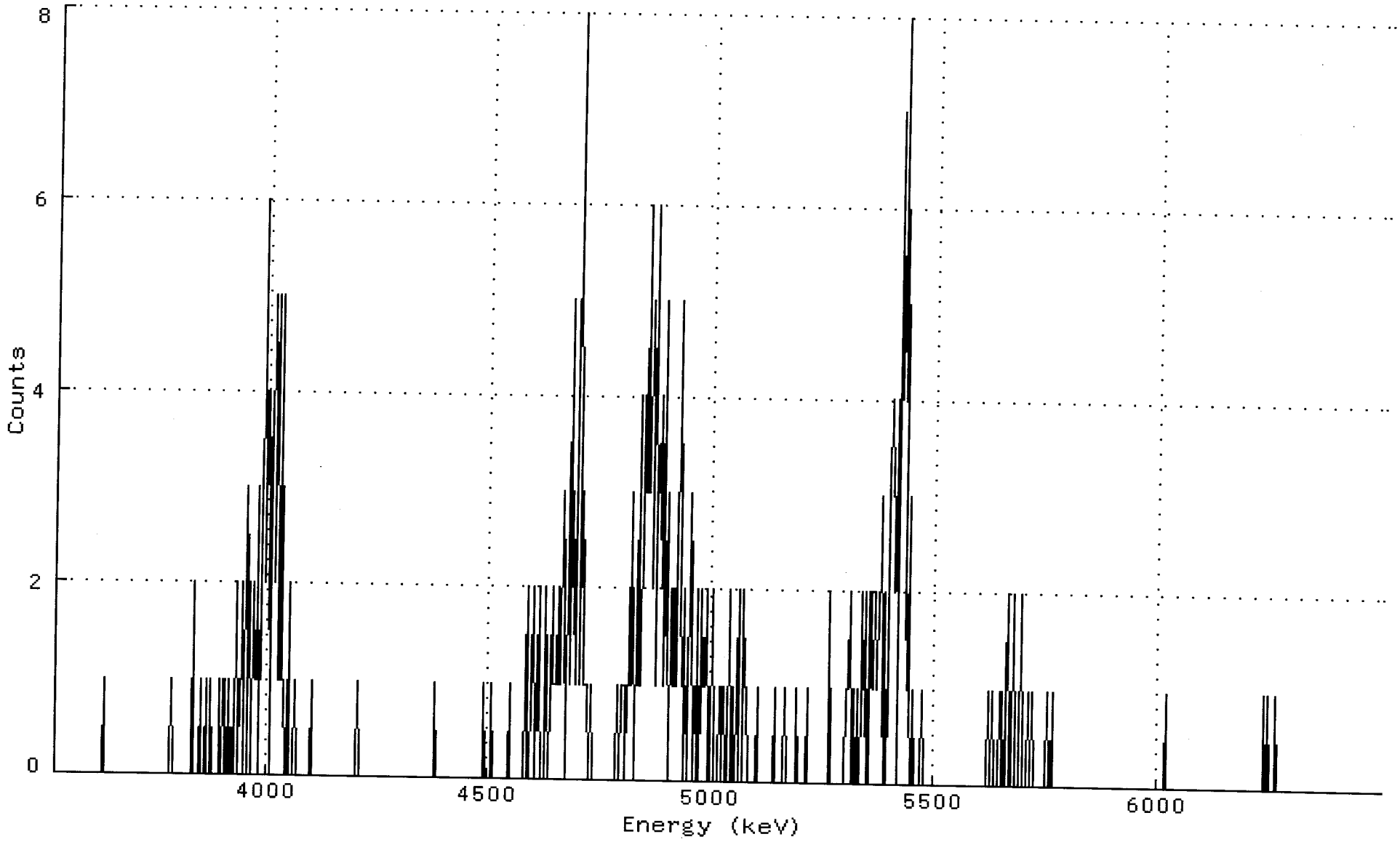
****

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 5-31-07

Reviewer _____ Date 5/31/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-TH$03_TH.CNF;1
Title : 003
Sample Title: 5601-FSS-SU5-1015
Start Time: 31-MAY-2007 08:09 Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.50877E+03
Real Time : 0 02:50:01.00 Sample ID : 03 Energy Slope : 3.05681E+00
Live Time : 0 02:50:01.00 Sample Type: TH Energy Quad : -1.35296E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-TH$03_TH

Channel

1:	10201	10201	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
113:	0	0	0	1	0	0	0	2	0	0	0	0	0	0	1
127:	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0
141:	0	1	1	2	0	3	2	1	0	0	1	0	2	0	0
155:	3	0	2	1	6	2	2	4	3	0	3	2	1	1	1
169:	5	1	1	5	1	1	1	0	0	2	0	5	4	2	2
183:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
253:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
351:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
365:	0	1	2	1	0	0	1	2	0	0	1	1	2	0	0
379:	1	1	2	1	1	3	3	2	1	0	0	1	2	1	0
393:	2	1	2	8	1	1	3	2	0	1	2	5	1	3	0
407:	0	0	0	0	0	0	0	2	1	1	0	1	0	1	0
421:	0	0	0	0	0	1	1	0	1	0	1	0	0	0	1
435:	1	3	1	2	0	1	1	4	1	1	3	4	3	6	1
449:	3	3	5	4	2	6	1	3	3	4	3	2	5	1	1
463:	2	3	2	0	2	2	1	1	3	1	5	2	2	0	1
477:	2	0	1	1	0	3	2	0	1	1	0	2	0	0	1
491:	2	1	1	1	2	0	0	2	2	0	1	0	0	0	1
505:	1	0	1	1	0	0	1	1	2	0	0	1	0	0	0
519:	2	0	0	0	2	1	0	0	0	0	0	0	0	0	0
533:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
547:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
561:	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
575:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
589:	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1
603:	1	1	2	0	1	0	0	1	0	0	0	0	0	1	2
617:	1	0	2	0	2	1	1	2	1	0	1	2	1	2	1
631:	0	2	0	1	3	4	3	3	2	1	2	2	3	1	5
645:	8	4	5	2	1	3	1	0	0	4	0	7	4	0	0
659:	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
729:	0	0	0	2	0	0	0	0	1	0	1	0	1	2	0
743:	0	1	0	0	1	0	0	0	0	0	2	0	0	0	0
757:	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
869:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
939:	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0													

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:23.35

Detector ID: 3
Live Time: 0 02:50:01.00
Batch Id: 0705098A-TH
Sample Type: TH

Acquisition Start: 31-MAY-2007 08:09:52.01
Real Time: 0 02:50:01.00
Sample Id: 03

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3984.63	83	0	43.09	156.76	96	100	8.14E-03	11.0	
2	0	4660.22	71	0	21.10	383.18	304	102	6.96E-03	11.9	
3	0	4901.69	150	0	97.82	465.26	405	129	1.47E-02	8.2	
4	0	5384.79	100	0	17.60	631.36	550	105	9.80E-03	10.0	
5	0	5791.41	5	0	336.25	773.20	741	124	4.90E-04	44.7	

Background Counts Within Peak Regions Generated: 31-MAY-2007 11:20:25.43

Live Time: 0 16:40:05.00

Acquisition Start: 25-MAY-2007 18:09:53.01
Real Time: 0 16:40:05.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3948.71	8	0	3.07	145.50	96	100	1.33E-04	35.4	
2	0	4574.63	6	0	0.00	354.50	304	102	1.00E-04	40.8	
3	0	4912.02	6	0	0.00	469.00	405	129	1.00E-04	40.8	
4	0	5299.00	15	0	200.22	602.00	550	105	2.50E-04	25.8	
5	0	5872.42	10	0	0.00	802.50	741	124	1.67E-04	31.6	

Net Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:25.75

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3984.63*	82	0	43.09	156.76	96	100	8.00E-03	11.2	
2	0	4660.22*	70	0	21.10	383.18	304	102	6.86E-03	12.1	
3	0	4901.69*	149	0	97.82	465.26	405	129	1.46E-02	8.2	
4	0	5384.79*	97	0	17.60	631.36	550	105	9.55E-03	10.3	
5	0	5791.41*	3	0	336.25	773.20	741	124	3.23E-04	69.7	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 31-MAY-2007 11:20:26

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00 Acquisition date : 31-MAY-2007 08:09:52
Sample ID : 03 Sample quantity : 1.0826 gram
Sample type : TH Sample geometry :
Detector name : 003 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	3984.63*	82	43.09	156.76	96	100	22.3		TH-232	1.01
0	4660.22*	70	21.10	383.18	304	102	24.1		TH-230	0.871
0	4901.69*	149	97.82	465.26	405	129	16.5		TH229	1.86
0	5384.79*	97	17.60	631.36	550	105	20.6		TH-228	1.46
0	5791.41*	3336.25		773.20	741	124	139.4		TH-227	4.276E-02

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
31-MAY-2007 11:20:36

****

Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-TH$04_TH.CNF

****

BATCH ID:	0705098A-TH	SAMPLE ID:	04
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.005E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	006
ACQ DATE:	31-MAY-2007 08:10	AVERAGE EFFICIENCY:	20.31%
ELAPSED LIVE TIME:	10202.	RECOVERY:	90.24%
TRACER ID:	TH-18A	TRACER FWHM (kev):	93.88
LAMBDA VALUE:	229.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	5.159	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE:	25-MAY-2007 07:39
BKG FILENAME:	B_006_25MAY07	BKG ELAPSED TIME:	60003.

****

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
TH-227	5850.0	5.32	0.68	97.5	7.980E-02	7.583E-02	9.655E-02
TH-228	5400.0	76.47	1.53	99.9	1.331E+00	4.041E-01	1.218E-01
TH229	4872.0	159.98	1.02	99.5	2.312E+00	4.255E-01	1.070E-01
TH-230	4672.0	83.49	0.51	99.8	1.203E+00	3.548E-01	8.690E-02
TH-232	3997.0	77.98	1.02	100.0	1.122E+00	3.380E-01	1.065E-01

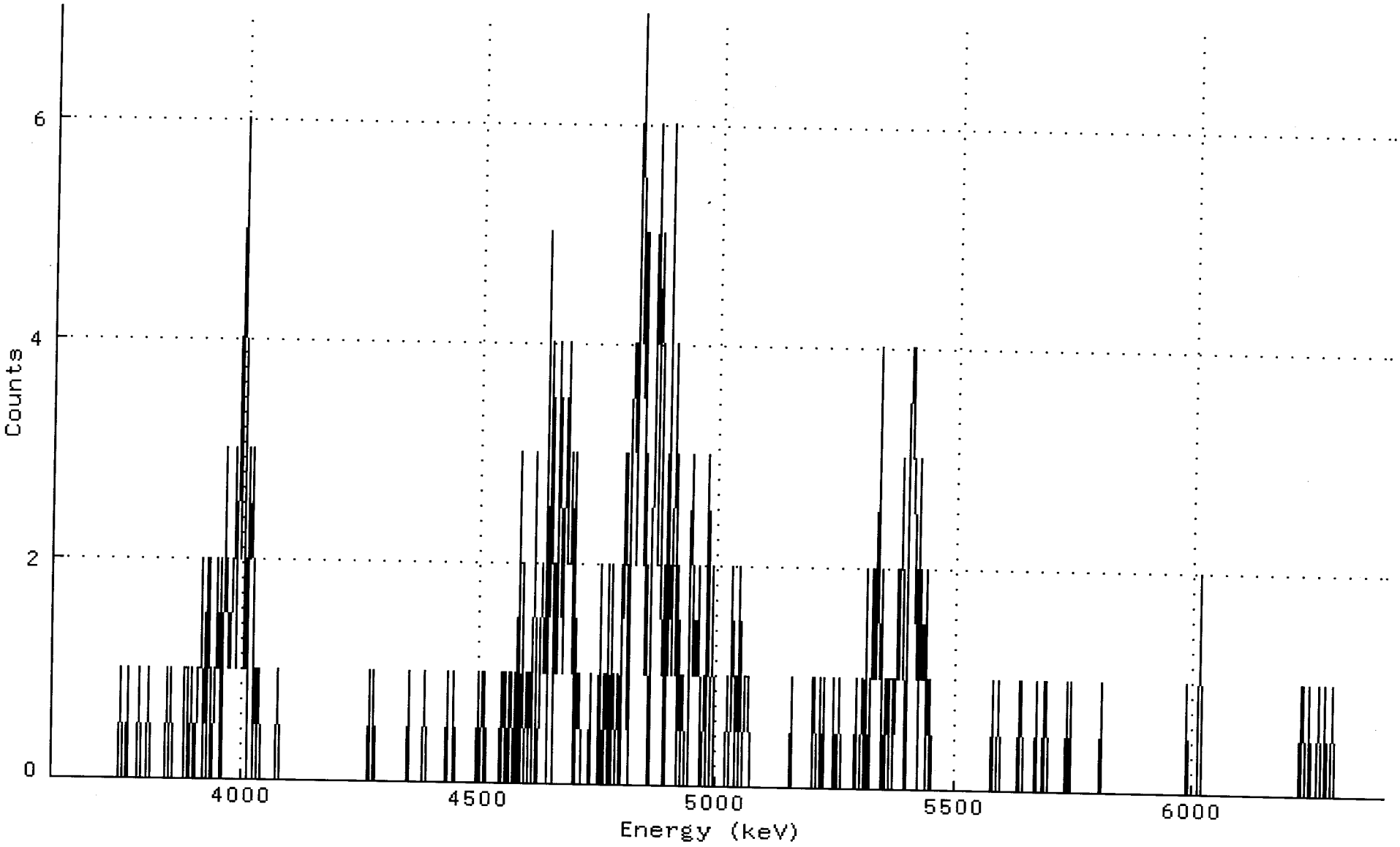
****

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 5-31-07

Reviewer _____ Date 5/31/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-TH$04_TH.CNF;1
Title : 006
Sample Title: 5601-FSS-SU5-1015
Start Time: 31-MAY-2007 08:10 Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.58467E+03
Real Time : 0 02:50:02.00 Sample ID : 04 Energy Slope : 2.86817E+00
Live Time : 0 02:50:02.00 Sample Type: TH Energy Quad : -1.20143E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-TH$04_TH

Channel

1:	10202	10202	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
71:	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
85:	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
99:	0	0	0	0	1	1	1	0	2	1	1	0	1	0	1
113:	1	1	1	2	0	1	2	0	2	0	1	1	0	1	1
127:	2	1	2	0	0	3	2	2	1	1	1	2	2	2	3
141:	1	4	2	4	6	2	1	2	0	3	2	3	1	0	0
155:	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
169:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
253:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
267:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
281:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
295:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
323:	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	1	1	1	0	0	1	0	1	0	0
351:	1	0	3	0	0	2	1	0	1	1	0	1	1	0	0
365:	3	0	0	0	1	1	2	1	1	5	0	3	4	3	3
379:	1	0	2	1	4	3	2	1	2	3	4	2	2	2	2
393:	3	2	0	3	0	1	1	1	0	0	0	0	0	0	0
407:	0	1	0	0	0	0	0	0	2	0	0	1	0	1	1
421:	0	2	0	2	0	1	0	1	1	0	2	0	3	2	2
435:	3	1	0	3	4	4	2	5	7	4	4	5	3	2	5
449:	1	1	2	0	0	1	4	6	2	4	5	3	2	1	1
463:	2	0	0	6	1	2	1	1	4	2	0	2	1	0	2
477:	1	1	0	0	0	0	2	3	1	2	1	1	2	0	0
491:	0	0	0	1	0	3	2	0	0	2	0	1	0	0	0
505:	0	0	0	0	0	0	1	1	1	1	2	0	1	0	0
519:	1	0	2	1	0	0	1	1	1	0	0	0	0	0	0
533:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
547:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
561:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
575:	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0
589:	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
603:	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
617:	0	2	0	0	1	0	2	1	2	1	4	2	1	2	1
631:	0	0	1	0	1	0	1	1	1	0	1	2	1	2	1
645:	3	2	2	0	0	3	4	4	3	3	2	2	1	3	0
659:	0	2	1	1	1	2	0	1	0	1	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
715:	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
743:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
757:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
869:	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0
967:	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
981:	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0													

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:32.13

Detector ID: 6
Live Time: 0 02:50:02.00
Batch Id: 0705098A-TH
Sample Type: TH

Acquisition Start: 31-MAY-2007 08:10:08.01
Real Time: 0 02:50:02.00
Sample Id: 04

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3966.52	79	0	11.64	133.89	75	107	7.74E-03	11.3	
2	0	4639.27	84	0	124.27	373.54	297	108	8.23E-03	10.9	
3	0	4881.40	161	0	93.88	461.01	405	137	1.58E-02	7.9	
4	0	5366.32	78	0	91.76	638.24	559	111	7.65E-03	11.3	
5	0	5880.70	6	0	2.87	829.33	762	132	5.88E-04	40.8	

Background Counts Within Peak Regions Generated: 31-MAY-2007 11:20:33.84

Live Time: 0 16:40:03.00

Acquisition Start: 25-MAY-2007 18:09:56.01
Real Time: 0 16:40:03.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3946.75	6	0	2.89	128.00	75	107	1.00E-04	40.8	
2	0	4574.73	3	0	205.18	350.50	297	108	5.00E-05	57.7	
3	0	4914.51	6	0	2.89	473.00	405	137	1.00E-04	40.8	
4	0	5300.35	9	0	0.00	614.00	559	111	1.50E-04	33.3	
5	0	5873.92	4	0	161.83	827.50	762	132	6.67E-05	50.0	

Net Sample Counts Within Peak Regions Generated: 31-MAY-2007 11:20:34.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3966.52*	78	0	11.64	133.89	75	107	7.64E-03	11.4	
2	0	4639.27*	83	0	124.27	373.54	297	108	8.18E-03	11.0	
3	0	4881.40*	160	0	93.88	461.01	405	137	1.57E-02	7.9	
4	0	5366.32*	76	0	91.76	638.24	559	111	7.50E-03	11.6	
5	0	5880.70*	5	0	2.87	829.33	762	132	5.21E-04	46.5	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 31-MAY-2007 11:20:35

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00 Acquisition date : 31-MAY-2007 08:10:08
Sample ID : 04 Sample quantity : 1.0050 gram
Sample type : TH Sample geometry :
Detector name : 006 Detector geometry:
Elapsed live time: 0 02:50:02.00 Elapsed real time: 0 02:50:02.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	3966.52*	78	11.64	133.89	75	107	22.8		TH-232	1.01
0	4639.27*	83	124.27	373.54	297	108	22.0		TH-230	1.09
0	4881.40*	160	93.88	461.01	405	137	15.9		TH229	2.09
0	5366.32*	76	91.76	638.24	559	111	23.1		TH-228	1.20
0	5880.70*	5	2.87	829.33	762	132	93.0		TH-227	7.201E-02

Review of QA results (Daily Pulser Check) 31-MAY-2007 06:22:34 Page 1

Detector	Parameter	Flag	Filename
1	ALL	Passed	D_001_NONE
2	ALL	Passed	D_002_NONE
3	ALL	Passed	D_003_NONE
4	OFFLINE		
5	OFFLINE		
6	ALL	Passed	D_006_NONE
7	OFFLINE		
8	ALL	Passed	D_008_NONE
9	ALL	Passed	D_009_NONE
10	ALL	Passed	D_010_NONE
11	ALL	Passed	D_011_NONE
12	ALL	Passed	D_012_NONE
13	ALL	Passed	D_013_NONE
14	ALL	Passed	D_014_NONE
15	OFFLINE		
16	ALL	Passed	D_016_NONE
17	ALL	Passed	D_017_NONE
18	ALL	Passed	D_018_NONE
19	ALL	Passed	D_019_NONE
20	ALL	Passed	D_020_NONE
21	OFFLINE		
22	OFFLINE		
23	ALL	Passed	D_023_NONE
24	OFFLINE		
25	ALL	Passed	D_025_NONE
26	ALL	Passed	D_026_NONE
27	ALL	Passed	D_027_NONE
28	ALL	Passed	D_028_NONE
29	ALL	Passed	D_029_NONE
30	ALL	Passed	D_030_NONE
31	ALL	Passed	D_031_NONE
32	OFFLINE		
33	ALL	Passed	D_033_NONE
34	ALL	Passed	D_034_NONE
35	OFFLINE		
36	OFFLINE		
37	ALL	Passed	D_037_NONE
38	ALL	Passed	D_038_NONE
39	OFFLINE		
40	OFFLINE		
41	ALL	Passed	D_041_NONE
42	ALL	Passed	D_042_NONE
43	OFFLINE		
44	OFFLINE		
45	ALL	Passed	D_045_NONE
46	ALL	Passed	D_046_NONE
47	ALL	Passed	D_047_NONE
48	ALL	Passed	D_048_NONE

APPROVAL DATE: 5-31-07 APPROVAL TIME: _____

APPROVED BY: _____ PROCEDURE # _____

SECTION X

ANALYTICAL DATA (RADIUM-226)

Work Order	07-05098
Analysis Code	Ra226
Run	1
Date Received	5/18/2007
Lab Deadline	6/1/2007
Client	Environmental Chemical Corporation
Project	Li Tungsten
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1493.09
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		05/18/07 00:00	1.0000E+00
02	MBL	BLANK		05/18/07 00:00	1.0000E+00
03	DUP	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0648E+00
04	DO	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0982E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

07-05098
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6952	1038.0	438.5	93.78		0.0246	0.0311	0.0065		93.78	2.34	1.00
02	MBL	0.6881	1027.4	397.0	85.78		0.0248	0.0310	0.0062		85.78	2.23	1.00
03	DUP	0.6842	1021.6	383.4	83.32		0.0246	0.0297	0.0051		83.32	1.76	1.00
04	DO	0.6899	1030.1	448.7	96.70		0.0244	0.0294	0.0050		96.70	1.71	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

07-05098
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			05/23/07 07:53	JBARNARD				
02	MBL			05/23/07 07:53	JBARNARD				
03	DUP			05/23/07 07:53	JBARNARD				
04	DO	05/22/07 07:46	KSALLINGS	05/23/07 07:53	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 07-05098
Client: Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/g	1.01E+01	1.34E+00	1.72E-01	1.03E+01	98.05	OK		OK	
02	RA-226	MBL	BLANK	pCi/g	-1.35E-02	1.21E-02	2.47E-01					OK	INV
03	RA-226	DUP	5601-FSS-SU5-1015	pCi/g	1.15E+00	3.63E-01	2.34E-01				INV	OK	
04	RA-226	DO	5601-FSS-SU5-1015	pCi/g	7.02E-01	2.50E-01	1.56E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-Ra226-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	05/18/07 00:00	1.00E+00	93.78		93.78			
02	RA-226	MBL	05/18/07 00:00	1.00E+00	85.78		85.78			
03	RA-226	DUP	11/21/06 11:10	1.06E+00	83.32		83.32			
04	RA-226	DO	11/21/06 11:10	1.10E+00	96.70		96.70			

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-Ra226-1

Client: Environmental Chemical Corporation
Eberline Services Work Order: 07-05098
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	05/29/07 18:00		A_Spec	1	170.08	7.46 E+02	2.00 E-03	20.8
02	RA-226	MBL	05/29/07 18:00		A_Spec	2	170.03	-8.50 E-01	5.00 E-03	19.5
03	RA-226	DUP	05/29/07 18:01		A_Spec	3	170.08	7.57 E+01	1.00 E-02	19.7
04	RA-226	DO	05/29/07 18:01		A_Spec	6	170.07	5.71 E+01	6.00 E-03	20.3

Count Room Report
Client: Environmental Chemical Co

07-05098-Ra226-1 (pCi/g) in SO
Tracer ID: Ba-6a

1-4

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	05/18/07 00:00	1.0000	0.6952	1037.9962	438.5000	93.78	2.34	1.00
02	MBL	BLANK	05/18/07 00:00	1.0000	0.6881	1027.3952	397.0000	85.78	2.23	1.00
03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	1.0648	0.6842	1021.5722	383.4000	83.32	1.76	1.00
04	DO	5601-FSS-SU5-1015	11/21/06 11:10	1.0982	0.6899	1030.0828	448.7000	96.70	1.71	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 5/23/2007 7:53 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
07-05098	1	Ra226	5/23/2007 7:50	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	*Sol #*	*Activity dpm/g*	*Solution Date*	*Approx Addition*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*
Ra-226	Ra-5b	44.185	5/23/2007	**0.500**	**0.5196**				10.34	0.476	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	*Isotope*	*Sol #*	*Activity dpm/g*	*Solution Date*	*Volume Used (g)*	*Approx Addition*
01	**Ba-133**	Ba-6a	1493.090	5/23/2007	**0.6952**	**0.6800**
02	**Ba-133**	Ba-6a	1493.090	5/23/2007	**0.6881**	**0.6800**
03	**Ba-133**	Ba-6a	1493.090	5/23/2007	**0.6842**	**0.6800**
04	**Ba-133**	Ba-6a	1493.090	5/23/2007	**0.6899**	**0.6800**

Balance Printer Tapes

Tracer

0.6952 g
-0.6881 g
-0.6842 g
-0.6899 g

LCS

0.5196 g
0.4094 g

Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
07-05098	1	Ra226	grams	6/1/2007	JBARNARD

Lab Fraction	Environmental Chemical Corporation Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dilution Data Dil Factor	Dilution Data Ratio	Aliquot Data Aliquot	Aliquot Data Net Equiv	MS Aliquot Data Aliquot	MS Aliquot Data Net Equiv	H-3 Solids Only Water Added (ml)	H-3 Solids Only H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	5601-FSS-SU5-1015	DUP					1.0648E+00	1.0648E+00				
04	5601-FSS-SU5-1015	DO					1.0982E+00	1.0982E+00				

1.0648 g
1.0982 g

Comments	

Technician: Barnard Date: 5/23/07

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
07-05098	1	Ra226			DJOHNSON

TRetec	Environmental Chemical Corporation	Sample	Carrier Data	Filter Data			Gravimetric
Fraction	Client ID	Type	Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	% Recovery
01	LCS	LCS		0.0246	0.0311	**0.0065**	
02	BLANK	MBL		0.0248	0.0310	**0.0062**	
03	DUP	DUP		0.0246	0.0297	**0.0051**	
04	5601-FSS-SU5-1015	DO		0.0244	0.0294	**0.0050**	

Technician: _____ Date: 5/29/07

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Printed: 5/22/2007 7:46 AM

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
07-05098	6/1/2007	5/21/2007	5/22/2007	5/23/2007	KSALLINGS

Eberline	Environmental Chemical Corporation	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	5601-FSS-SU5-1015	28.2600	1656.3000	1501.9600	1628.0400	1473.7000	9.48%	90.52%			

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sallings Date: Analysis: Rough Prep Logbook

Analysis: Ra226 Page No. 5628

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
30-MAY-2007 10:22:50

****

Spectral File: ND_AMS_ARCHIVE_C:C_0705098A-RA$01_RA.CNF

****

BATCH ID:	0705098A-RA	SAMPLE ID:	01
SAMPLE DATE:	29-MAY-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	SPIKE	DETECTOR NUMBER:	001
ACQ DATE:	29-MAY-2007 18:00	AVERAGE EFFICIENCY:	20.79%
ELAPSED LIVE TIME:	10205.	RECOVERY:	93.78%
TRACER ID:	NONE	TRACER FWHM (kev):	0.00
LAMBDA VALUE:	0.	ROI TYPE:	MANUAL
TRACER DPM AT SAMPLE DATE:	0.000	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE: 25-MAY-2007	07:39
BKG FILENAME:	B_001_25MAY07	BKG ELAPSED TIME:	60004.
		SAF:	2.34

****

NUCLIDE ACTIVITY SUMMARY

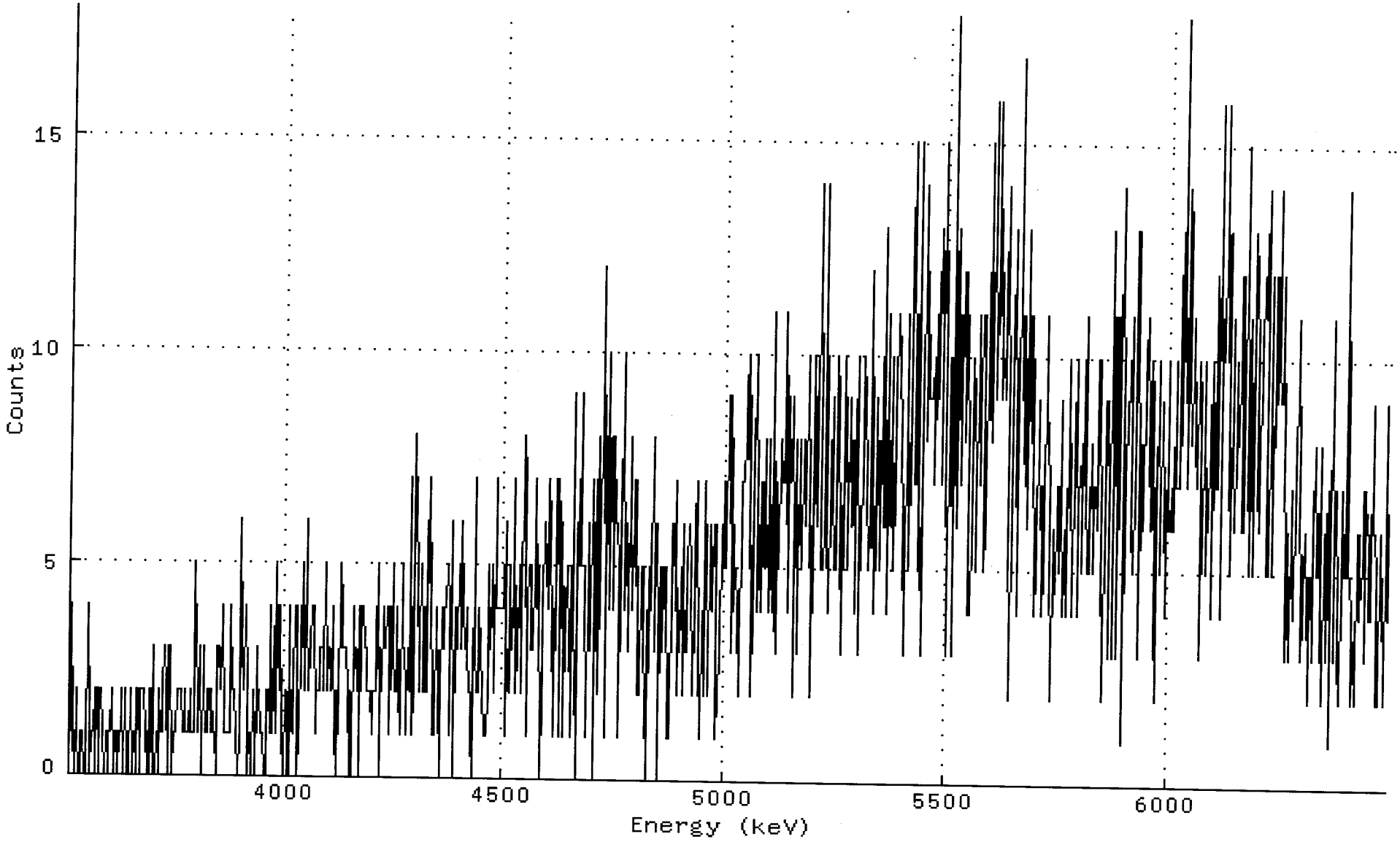
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
PO-218	6003.0	3002.18	2.38	100.0	4.080E+01	3.639E+00	3.143E-01
RN-222	5490.0	3017.92	0.68	99.9	4.104E+01	3.656E+00	2.083E-01
RA-226	4785.0	746.12	0.34	100.0	1.014E+01	1.337E+00	1.724E-01

****

Analyst _____ 5/30/07 Date

Reviewer _____ 5/31/07 Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0705098A-RA$01_RA.CNF;2
Title : 001
Sample Title: SPIKE
Start Time: 29-MAY-2007 18:00 Sample Time: 29-MAY-2007 00:00 Energy Offset: 3.49784E+03
Real Time : 0 02:50:06.00 Sample ID : 01 Energy Slope : 3.08052E+00
Live Time : 0 02:50:05.00 Sample Type: RA Energy Quad : -1.49306E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0705098A-RA$01_RA

Channel

1:	10206	10205	1	1	4	1	0	2	1	0	1	0	1	0	
15:	1	0	4	1	0	1	1	2	0	2	0	2	2	1	
29:	1	0	1	0	1	1	2	2	0	1	1	0	1	1	
43:	2	0	2	0	1	0	2	2	0	1	0	2	2	0	
57:	2	2	2	2	1	0	2	0	1	3	0	0	1	0	
71:	2	1	1	2	3	2	0	3	3	0	0	1	1	1	
85:	2	2	2	2	1	2	1	1	1	2	1	1	1	5	
99:	3	2	1	3	0	3	2	1	1	2	2	1	2	1	
113:	1	0	3	3	2	2	4	1	1	1	1	1	4	2	
127:	2	2	1	0	1	6	3	2	2	4	2	0	1	0	
141:	2	2	0	3	1	2	1	1	1	0	0	2	2	1	
155:	4	1	2	5	1	4	2	4	1	0	0	2	0	4	
169:	0	2	1	2	4	4	0	1	3	5	4	2	6	4	
183:	2	3	3	4	4	1	2	2	2	3	3	3	2	5	
197:	2	3	3	2	4	3	1	0	2	1	5	4	3	3	
211:	3	3	2	0	2	0	4	2	3	2	4	0	4	4	
225:	4	3	3	2	2	2	1	2	2	2	3	5	0	3	
239:	2	4	3	3	4	4	1	3	5	3	2	2	4	2	
253:	1	5	3	3	2	1	3	2	7	1	2	8	6	5	
267:	2	3	5	3	2	2	6	2	7	4	2	1	1	4	
281:	4	2	0	2	4	3	4	4	5	4	1	6	0	0	
295:	4	3	3	5	3	6	4	3	4	3	2	2	1	0	
309:	7	3	2	2	4	3	2	2	1	1	2	5	3	4	
323:	5	2	7	4	4	4	4	4	4	6	1	3	2	5	
337:	3	4	7	2	3	3	5	2	3	8	7	1	4	5	
351:	5	3	3	5	7	4	4	5	0	2	4	6	5	4	
365:	7	6	3	4	1	7	3	7	6	1	6	3	1	4	
379:	5	3	4	1	9	3	3	0	6	5	9	5	5	5	
393:	5	1	5	6	3	7	5	0	6	8	2	5	9	12	
407:	6	8	1	10	6	4	8	4	8	6	6	5	1	5	
421:	10	9	4	6	6	3	8	6	4	7	5	7	2	5	
435:	2	5	5	4	1	4	0	5	4	4	8	4	3	6	
449:	3	0	5	5	3	5	3	5	1	1	5	6	6	4	
463:	7	2	4	3	4	6	2	4	3	5	6	5	5	2	
477:	4	6	7	2	3	1	4	2	7	5	3	2	6	5	
491:	4	6	6	1	2	3	4	5	7	5	5	9	8	9	
505:	3	8	4	5	5	4	2	2	7	7	8	9	10	5	
519:	9	2	4	7	10	6	4	5	7	4	6	8	5	6	
533:	4	8	5	4	11	4	3	7	5	8	8	7	7	11	
547:	8	4	9	7	9	5	2	8	5	3	8	5	5	8	
561:	7	6	10	6	8	2	10	4	9	6	6	14	7	5	
575:	5	6	14	6	4	4	7	9	7	5	5	10	9	5	
589:	6	3	10	5	9	6	5	9	7	6	8	4	8	10	
603:	3	4	6	7	10	9	7	7	5	6	12	7	4	9	
617:	5	8	5	8	7	13	6	6	11	4	8	6	10	5	
631:	7	9	11	10	10	8	6	6	3	10	11	5	8	12	
645:	15	7	11	7	15	5	6	3	7	14	8	12	9	9	
659:	9	9	10	7	10	12	9	13	12	7	15	10	9	3	
673:	10	7	10	3	18	7	13	6	11	7	10	12	8	12	
687:	10	8	4	4	6	10	9	7	5	11	7	9	11	11	
701:	5	6	11	9	15	9	8	16	14	9	12	16	11	12	
715:	9	10	9	11	14	7	7	2	7	10	13	7	9	4	
729:	17	13	9	11	8	7	13	6	11	8	11	9	4	4	
743:	5	9	8	6	7	4	5	11	9	8	7	6	2	6	
757:	4	5	6	7	5	9	7	4	6	5	4	10	7	6	
771:	8	4	8	8	10	4	7	7	8	5	9	11	7	5	
785:	5	6	8	5	7	7	6	10	10	5	6	2	7	9	
799:	9	6	3	13	9	3	11	11	3	9	9	14	7	1	
813:	8	8	9	9	11	6	5	7	13	13	5	3	8	8	
827:	6	10	11	11	8	6	10	9	3	7	2	6	10	5	
841:	6	9	6	7	4	10	6	6	7	6	6	10	7	7	
855:	7	12	8	18	10	11	7	14	13	10	8	10	11	8	
869:	7	7	10	9	3	7	7	10	5	7	6	8	10	4	
883:	9	7	12	8	7	16	4	11	10	13	16	10	13	8	
897:	5	11	8	6	8	10	8	10	12	6	12	6	15	13	
911:	8	5	11	8	5	13	12	10	7	6	11	10	12	11	
925:	12	14	5	5	9	12	5	12	8	10	14	10	9	9	
939:	12	7	6	3	4	6	3	7	5	4	7	6	11	7	
953:	8	3	4	5	6	4	5	2	5	5	3	6	8	5	
967:	6	5	8	4	2	6	6	3	6	7	1	4	11	3	
981:	6	7	4	3	2	5	7	5	5	14	7	5	5	4	
995:	2	3	4	2	6	6	4	5	5	7	3	7	6	6	
1009:	4	4	9	6	6	5	2	2	6	5	4	5	2	6	
1023:	0	0													

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Gross Sample Counts Within Peak Regions Generated: 30-MAY-2007 10:22:42.39

Detector ID: 1
Live Time: 0 02:50:05.00
Batch Id: 0705098A-RA
Sample Type: RA

Acquisition Start: 29-MAY-2007 18:00:39.01
Real Time: 0 02:50:06.00
Sample Id: 01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4742.96	319	0152.65		412.44	382	63	3.13E-02	5.6	
2	0	5299.65	1290	0509.68		602.50	507	176	1.26E-01	2.8	
3	0	5806.94	1284	0	0.00	778.99	701	162	1.26E-01	2.8	

Background Counts Within Peak Regions Generated: 30-MAY-2007 10:22:47.96

Live Time: 0 16:40:04.00

Acquisition Start: 25-MAY-2007 18:09:47.01
Real Time: 0 16:40:04.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4743.92	2	0	76.90	413.00	382	63	3.33E-05	70.7	
2	0	5275.09	4	0224.55		594.50	507	176	6.67E-05	50.0	
3	0	5812.12	14	0409.12		781.50	701	162	2.33E-04	26.7	

Net Sample Counts Within Peak Regions Generated: 30-MAY-2007 10:22:48.26

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4742.96*	746	0152.65		412.44	382	63	7.31E-02	5.6	
2	0	5299.65*	3018	0509.68		602.50	507	176	2.96E-01	2.8	
3	0	5806.94*	3002	0	0.00	778.99	701	162	2.94E-01	2.8	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 30-MAY-2007 10:22:49

Configuration : MCA0:[AMSCOUNT]0000B288$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : SPIKE
Sample date : 29-MAY-2007 00:00:00 Acquisition date : 29-MAY-2007 18:00:39
Sample ID : 01 Sample quantity : 1.0000 gram
Sample type : RA Sample geometry :
Detector name : 001 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 150.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4742.96*	746152.65		412.44	382	63	11.2		RA-226	9.51
0	5299.65*	3018509.68		602.50	507	176	5.6		RN-222	38.5
0	5806.94*	3002	0.00	778.99	701	162	5.6		PO-218	38.3

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Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
30-MAY-2007 06:09:18

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Spectral File: ND_AMS_ARCHIVE_R:R_0705098A-RA$02_RA.CNF

****

BATCH ID:	0705098A-RA	SAMPLE ID:	02
SAMPLE DATE:	29-MAY-2007 00:00	ALIQUOT: 1.000E+00	gram
SAMPLE TITLE:	BLANK	DETECTOR NUMBER:	002
ACQ DATE:	29-MAY-2007 18:00	AVERAGE EFFICIENCY:	19.49%
ELAPSED LIVE TIME:	10202.	RECOVERY:	85.78%
TRACER ID:	NONE	TRACER FWHM (kev):	0.00
LAMBDA VALUE:	0.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	0.000	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE: 25-MAY-2007	07:39
BKG FILENAME:	B_002_25MAY07	BKG ELAPSED TIME:	60000.
		SAF:	2.23

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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
PO-218	6003.0	2.93	1.53	100.0	4.643E-02	1.013E-01	2.991E-01
RN-222	5490.0	9.62	1.53	99.9	1.525E-01	1.593E-01	2.992E-01
RA-226	4785.0	-0.85	0.85	100.0	-1.347E-02	1.208E-02	2.472E-01

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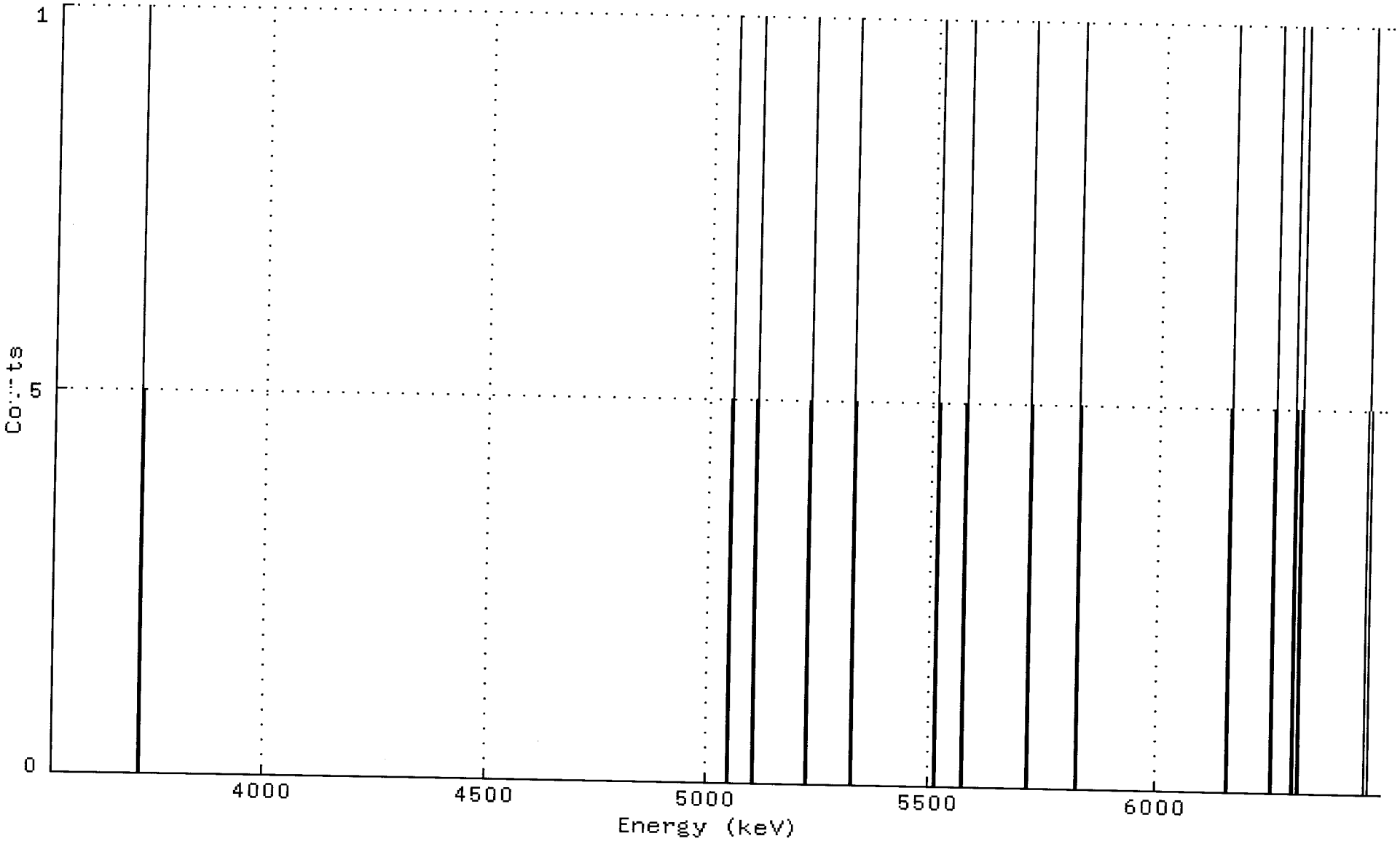
Analyst _____ Date 5-30-07

Reviewer _____ Date 5/30/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0705098A-RA$02_RA.CNF;1
Title : 002
Sample Title: BLANK
Start Time: 29-MAY-2007 18:00 Sample Time: 29-MAY-2007 00:00 Energy Offset: 3.51300E+03
Real Time : 0 02:50:02.00 Sample ID : 02 Energy Slope : 3.03709E+00
Live Time : 0 02:50:02.00 Sample Type: RA Energy Quad : -1.22320E-04



Channel Contents for ND_AMS_ARCHIVE_R:R_0705098A-RA$02_RA

Channel

1:	10202	10202	0	0	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
183:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
253:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
351:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
365:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
379:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
407:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
421:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
435:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
463:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
477:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
491:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
519:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
533:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
547:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
575:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
589:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
603:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
631:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
645:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
659:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701:	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
715:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
743:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
827:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
869:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
883:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
911:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
925:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
953:	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1023:	0	0													

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Gross Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:08:52.42

Detector ID: 2
Live Time: 0 02:50:02.00
Batch Id: 0705098A-RA
Sample Type: RA

Acquisition Start: 29-MAY-2007 18:00:50.01
Real Time: 0 02:50:02.00
Sample Id: 02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4606.72	0	0	0.00	365.50	287	158	0.00E+00	0.0	
2	0	5241.47	5	0488.97		582.80	507	176	4.90E-04	44.7	
3	0	5769.07	2	0121.48		766.50	702	162	1.96E-04	70.7	

Background Counts Within Peak Regions Generated: 30-MAY-2007 06:09:16.18

Live Time: 0 16:40:00.00

Acquisition Start: 25-MAY-2007 18:09:50.01
Real Time: 0 16:40:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4603.83	5	0225.38		365.50	287	158	8.33E-05	44.7	
2	0	5272.88	9	0	3.05	594.50	507	176	1.50E-04	33.3	
3	0	5812.02	9	0158.37		782.50	702	162	1.50E-04	33.3	

Net Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:09:16.51

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4606.72*	-1	0	0.00	365.50	287	158	-8.33E-05	44.7	
2	0	5241.47*	10	0488.97		582.80	507	176	9.43E-04	52.1	
3	0	5769.07*	3	0121.48		766.50	702	162	2.87E-04	109.0	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 30-MAY-2007 06:09:17

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : BLANK
Sample date : 29-MAY-2007 00:00:00
Sample ID : 02
Sample type : RA
Detector name : 002
Elapsed live time: 0 02:50:02.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 29-MAY-2007 18:00:50
Sample quantity : 1.0000 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:02.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4606.72*	-1	0.00	365.50	287	158	89.4		RA-226	-1.155E-02
0	5241.47*	10488.97		582.80	507	176	104.2		RN-222	0.131
0	5769.07*	3121.48		766.50	702	162	218.1		PO-218	3.983E-02

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
30-MAY-2007 06:09:34

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Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-RA$03_RA.CNF

****

BATCH ID:	0705098A-RA	SAMPLE ID:	03
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.065E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	003
ACQ DATE:	29-MAY-2007 18:01	AVERAGE EFFICIENCY:	19.70%
ELAPSED LIVE TIME:	10205.	RECOVERY:	83.32%
TRACER ID:	NONE	TRACER FWHM (kev):	0.00
LAMBDA VALUE:	0.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	0.000	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE: 25-MAY-2007	07:39
BKG FILENAME:	B_003_25MAY07	BKG ELAPSED TIME:	60005.
		SAF:	1.76

****

NUCLIDE ACTIVITY SUMMARY

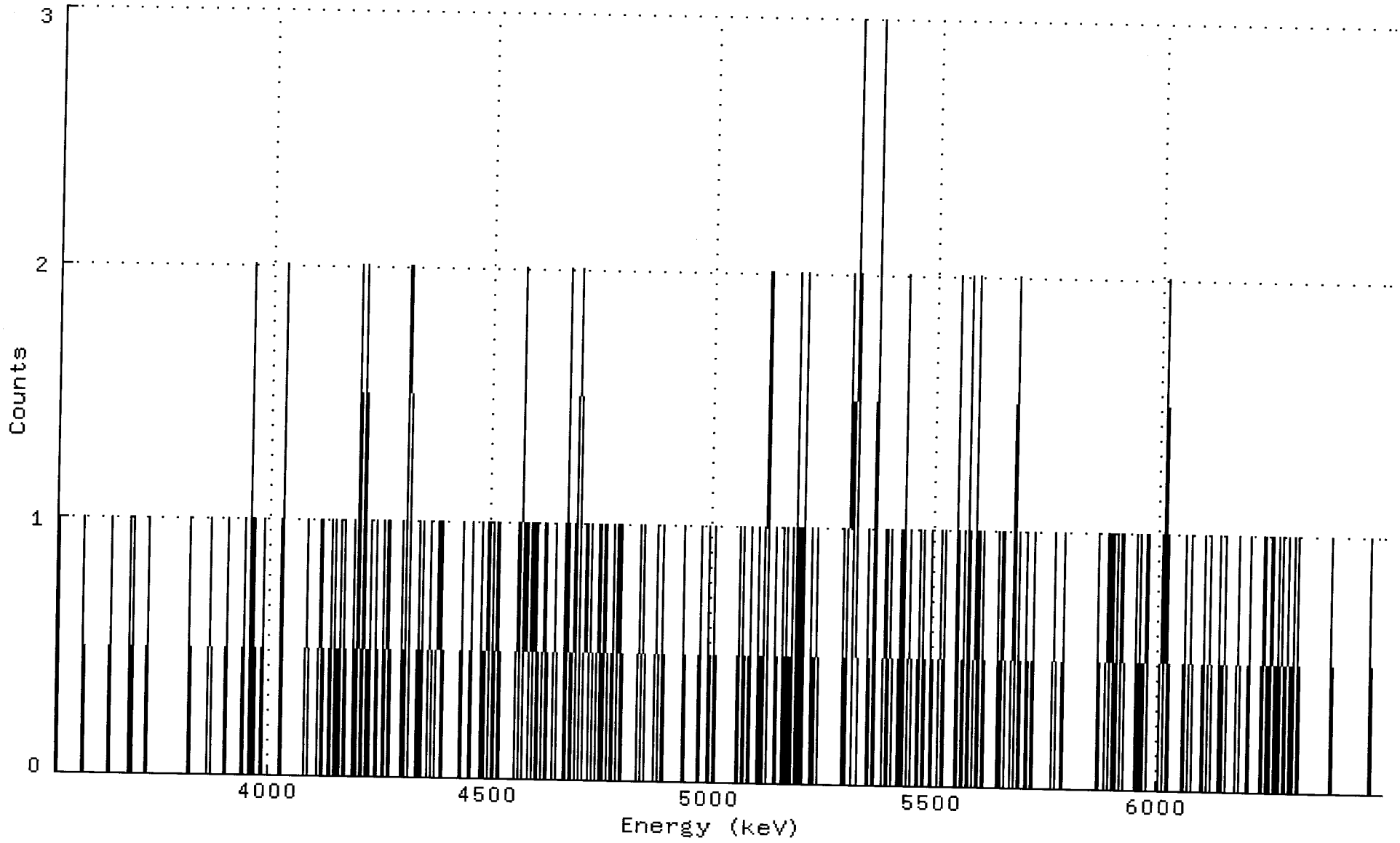
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
PO-218	6003.0	55.70	2.38	100.0	8.444E-01	3.127E-01	2.637E-01
RN-222	5490.0	79.32	3.40	99.9	1.203E+00	3.762E-01	3.012E-01
RA-226	4785.0	75.74	1.70	100.0	1.148E+00	3.632E-01	2.340E-01

****

Analyst _____ Date 5.30.07

Reviewer _____ Date 5/31/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-RA$03_RA.CNF;1
Title : 003
Sample Title: 5601-FSS-SU5-1015
Start Time: 29-MAY-2007 18:01 Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.50877E+03
Real Time : 0 02:50:05.00 Sample ID : 03 Energy Slope : 3.05681E+00
Live Time : 0 02:50:05.00 Sample Type: RA Energy Quad : -1.35296E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-RA$03_RA

Channel

1:	10205	10205	0	1	0	0	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
71:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
127:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
141:	0	0	1	0	0	0	0	2	0	0	1	0	0	0	0
155:	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
169:	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
183:	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
197:	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
211:	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0
225:	0	1	0	0	2	1	0	0	2	1	0	0	0	0	0
239:	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
253:	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0
267:	2	1	0	0	0	0	0	0	0	0	0	1	0	0	2
281:	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0
295:	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
309:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
323:	1	0	0	0	1	0	0	1	1	0	0	0	0	0	1
337:	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
351:	0	0	2	0	0	1	0	1	0	0	1	0	0	1	1
365:	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0
379:	1	0	0	0	0	0	0	0	0	2	0	1	0	0	0
393:	1	0	1	2	1	0	0	0	0	0	1	1	1	0	1
407:	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0
421:	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0
435:	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
449:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
463:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
477:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
491:	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
505:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
519:	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
533:	0	0	1	0	0	1	0	2	2	0	0	0	0	0	0
547:	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1
561:	0	0	0	2	0	0	1	0	2	0	0	0	0	0	0
575:	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
589:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
603:	0	0	2	1	1	0	3	1	1	0	0	0	0	0	0
617:	0	0	0	1	0	0	0	0	3	0	0	0	0	0	0
631:	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1
645:	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0
659:	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
673:	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0
687:	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0
701:	0	1	2	0	1	0	0	0	0	0	0	2	0	0	0
715:	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
729:	0	0	0	1	2	0	0	0	1	0	1	0	0	0	0
743:	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
771:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
799:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
813:	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1
827:	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0
855:	0	0	0	0	0	0	0	0	0	1	0	2	1	0	1
869:	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
883:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
897:	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
911:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
925:	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
939:	0	0	1	0	0	1	1	0	0	0	0	1	0	1	0
953:	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
967:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
981:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
995:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1023:	0	0													

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Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:09:24.63

Detector ID: 3
Live Time: 0 02:50:05.00
Batch Id: 0705098A-RA
Sample Type: RA

Acquisition Start: 29-MAY-2007 18:01:12.01
Real Time: 0 02:50:05.00
Sample Id: 03

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4620.60	44	0136.03	369.77	287	157		4.31E-03	15.1	
2	0	5287.68	47	0328.57	597.77	506	176		4.61E-03	14.6	
3	0	5810.59	33	0458.39	779.94	701	162		3.23E-03	17.4	

Background Counts Within Peak Regions Generated: 30-MAY-2007 06:09:32.04

Live Time: 0 16:40:05.00

Acquisition Start: 25-MAY-2007 18:09:53.01
Real Time: 0 16:40:05.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4605.74	10	0426.65	365.00	287	157		1.67E-04	31.6	
2	0	5274.43	20	0200.22	593.50	506	176		3.33E-04	22.4	
3	0	5812.92	14	0426.65	781.50	701	162		2.33E-04	26.7	

Net Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:09:32.32

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4620.60*	76	0136.03	369.77	287	157		7.42E-03	15.4	
2	0	5287.68*	79	0328.57	597.77	506	176		7.77E-03	15.2	
3	0	5810.59*	56	0458.39	779.94	701	162		5.46E-03	18.2	

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 30-MAY-2007 06:09:33

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00 Acquisition date : 29-MAY-2007 18:01:12
Sample ID : 03 Sample quantity : 1.0648 gram
Sample type : RA Sample geometry :
Detector name : 003 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:05.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4620.60*	76136.03	369.77	287	157	30.9			RA-226	0.957
0	5287.68*	79328.57	597.77	506	176	30.5			RN-222	1.00
0	5810.59*	56458.39	779.94	701	162	36.4			PO-218	0.704

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ALPHA SPECTROMETRY REPORT
30-MAY-2007 06:10:01

****

Spectral File: ND_AMS_ARCHIVE_S:S_0705098A-RA$04_RA.CNF

****

BATCH ID:	0705098A-RA	SAMPLE ID:	04
SAMPLE DATE:	21-NOV-2006 00:00	ALIQUOT: 1.098E+00	gram
SAMPLE TITLE:	5601-FSS-SU5-1015	DETECTOR NUMBER:	006
ACQ DATE:	29-MAY-2007 18:01	AVERAGE EFFICIENCY:	20.31%
ELAPSED LIVE TIME:	10204.	RECOVERY:	96.70%
TRACER ID:	NONE	TRACER FWHM (kev):	0.00
LAMBDA VALUE:	0.	ROI TYPE:	STANDARD
TRACER DPM AT SAMPLE DATE:	0.000	CONFIDENCE FACTOR:	4.65
SAMPLE MATRIX:	SOIL	LLD CONSTANT:	2.71
ENERGY CAL DATE:	25-MAY-2007 07:39	EFF CAL DATE: 25-MAY-2007	07:39
BKG FILENAME:	B_006_25MAY07	BKG ELAPSED TIME:	60003.
		SAF:	1.71

****

NUCLIDE ACTIVITY SUMMARY

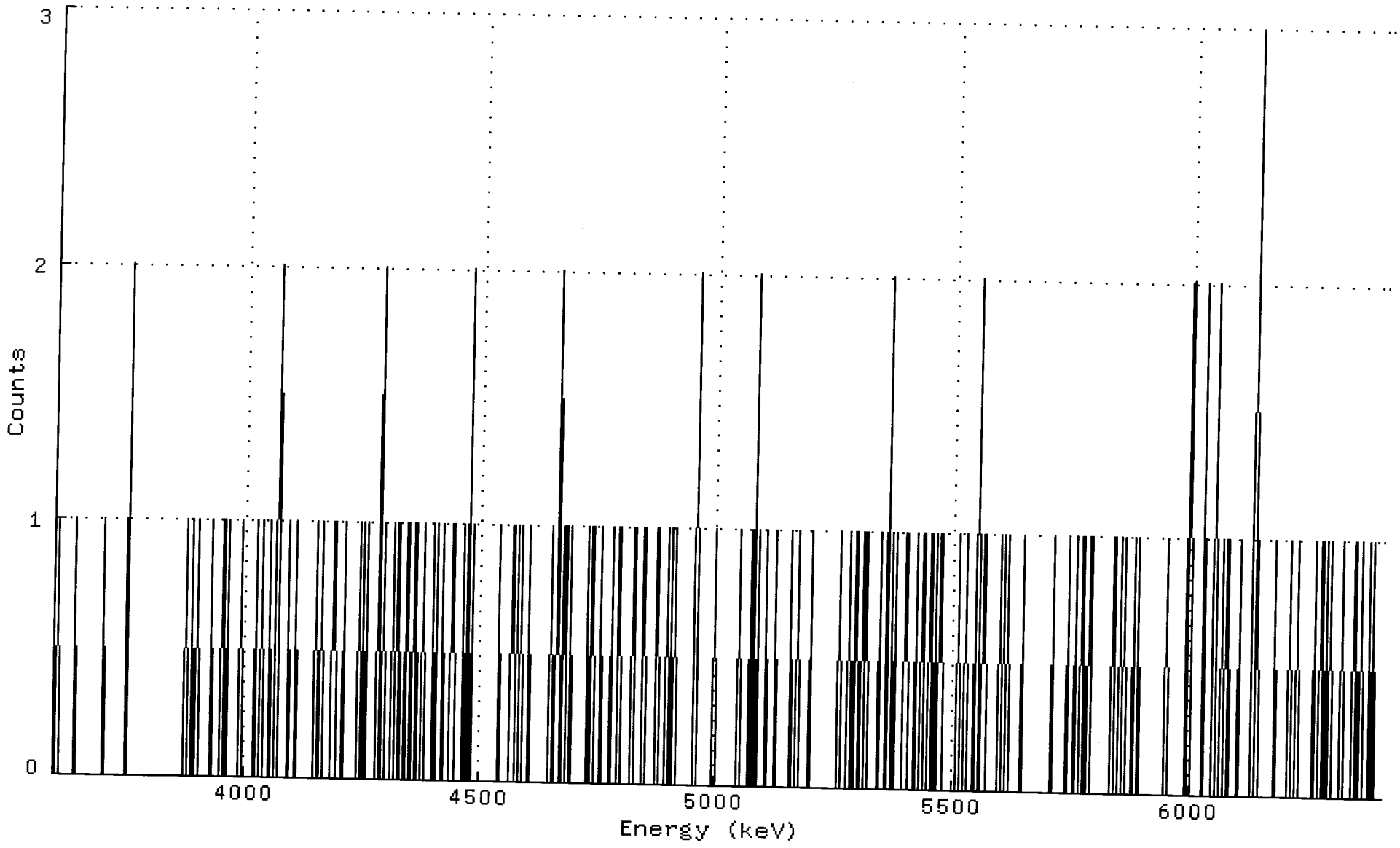
NUCLIDE	ENERGY	NET AREA	BKG	%ABN	ACTIVITY pCi/ gram	TPU/ERROR 2-SIGMA	MDC pCi/ gram
PO-218	6003.0	39.85	1.19	100.0	4.896E-01	2.089E-01	1.635E-01
RN-222	5490.0	61.06	2.21	99.9	7.506E-01	2.614E-01	2.023E-01
RA-226	4785.0	57.12	1.02	100.0	7.016E-01	2.500E-01	1.555E-01

****

Analyst _____ Date 5-30-07

Reviewer _____ Date 5/30/07

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0705098A-RA$04_RA.CNF;1
Title : 006
Sample Title: 5601-FSS-SU5-1015
Start Time: 29-MAY-2007 18:01 Sample Time: 21-NOV-2006 00:00 Energy Offset: 3.58467E+03
Real Time : 0 02:50:04.00 Sample ID : 04 Energy Slope : 2.86817E+00
Live Time : 0 02:50:04.00 Sample Type: RA Energy Quad : -1.20143E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0705098A-RA$04_RA

Channel

1:	10204	10204	0	0	0	1	0	0	0	0	0	0	0	0	0
15:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
29:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
43:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57:	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
127:	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0
141:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
155:	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
169:	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0
183:	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
197:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
211:	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0
239:	0	0	0	0	0	0	0	0	1	2	0	1	0	1	0
253:	0	0	0	0	1	1	0	1	1	0	1	0	1	0	0
267:	1	0	1	0	0	0	1	0	1	0	1	0	0	0	1
281:	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0
295:	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0
309:	0	0	1	0	0	2	0	0	0	1	0	0	0	0	0
323:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0
351:	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0
365:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
379:	0	0	0	1	2	1	0	0	1	0	1	1	0	0	0
393:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
407:	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
421:	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0
435:	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1
449:	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0
463:	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
477:	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
491:	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
505:	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
519:	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
533:	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
547:	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
561:	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
575:	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
589:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
603:	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0
617:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
631:	0	0	0	0	0	0	2	0	0	0	0	1	0	1	0
645:	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1
659:	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0
673:	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0
687:	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0
701:	0	0	0	1	0	2	0	1	0	1	1	1	0	0	0
715:	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0
729:	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
743:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
757:	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
771:	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
785:	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0
799:	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
813:	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0
827:	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
841:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
869:	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
883:	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
897:	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0
911:	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0
925:	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
939:	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
953:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
967:	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0
981:	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
995:	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0
1009:	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0
1023:	0	0													

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Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:09:38.93

Detector ID: 6
Live Time: 0 02:50:04.00
Batch Id: 0705098A-RA
Sample Type: RA

Acquisition Start: 29-MAY-2007 18:01:28.01
Real Time: 0 02:50:04.00
Sample Id: 04

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4613.66	34	0202.21	364.32	279	167	3.33E-03	17.1		
2	0	5313.00	37	0298.29	618.62	511	188	3.63E-03	16.4		
3	0	5829.28	24	0 40.15	810.08	719	172	2.35E-03	20.4		

Background Counts Within Peak Regions Generated: 30-MAY-2007 06:09:59.31

Live Time: 0 16:40:03.00

Acquisition Start: 25-MAY-2007 18:09:56.01
Real Time: 0 16:40:03.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4606.81	6	0352.56	362.00	279	167	1.00E-04	40.8		
2	0	5274.53	13	0468.16	604.50	511	188	2.17E-04	27.7		
3	0	5812.75	7	0248.53	804.50	719	172	1.17E-04	37.8		

Net Sample Counts Within Peak Regions Generated: 30-MAY-2007 06:09:59.62

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4613.66*	57	0202.21	364.32	279	167	5.60E-03	17.5		
2	0	5313.00*	61	0298.29	618.62	511	188	5.98E-03	17.1		
3	0	5829.28*	40	0 40.15	810.08	719	172	3.91E-03	21.1		

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 30-MAY-2007 06:10:00

Configuration : MCA0:[AMSCOUNT]0001DD76$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : 5601-FSS-SU5-1015
Sample date : 21-NOV-2006 00:00:00
Sample ID : 04
Sample type : RA
Detector name : 006
Elapsed live time: 0 02:50:04.00
Energy tolerance : 100.00 keV
Errors propagated: Yes
Efficiency type : Average value
Abundance limit : 75.00

Acquisition date : 29-MAY-2007 18:01:28
Sample quantity : 1.0982 gram
Sample geometry :
Detector geometry:
Elapsed real time: 0 02:50:04.00 0.0%
Half life ratio : 8.00
Systematic Error : 3.00 %
Efficiencies at : Peak Energy

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity pCi/gram
0	4613.66*	57202.21	364.32	279	167	34.9			RA-226	0.678
0	5313.00*	61298.29	618.62	511	188	34.1			RN-222	0.726
0	5829.28*	40 40.15	810.08	719	172	42.1			PO-218	0.473

Review of QA results (Daily Pulser Check) 29-MAY-2007 05:29:17 Page 1

Detector	Parameter	Flag	Filename
1	ALL	Passed	D_001_NONE
2	ALL	Passed	D_002_NONE
3	ALL	Passed	D_003_NONE
4	OFFLINE		
5	OFFLINE		
6	ALL	Passed	D_006_NONE
7	OFFLINE		
8	ALL	Passed	D_008_NONE
9	ALL	Passed	D_009_NONE
10	ALL	Passed	D_010_NONE
11	ALL	Passed	D_011_NONE
12	ALL	Passed	D_012_NONE
13	ALL	Passed	D_013_NONE
14	ALL	Passed	D_014_NONE
15	OFFLINE		
16	ALL	Passed	D_016_NONE
17	ALL	Passed	D_017_NONE
18	ALL	Passed	D_018_NONE
19	ALL	Passed	D_019_NONE
20	ALL	Passed	D_020_NONE
21	OFFLINE		
22	OFFLINE		
23	ALL	Passed	D_023_NONE
24	OFFLINE		
25	ALL	Passed	D_025_NONE
26	ALL	Passed	D_026_NONE
27	ALL	Passed	D_027_NONE
28	ALL	Passed	D_028_NONE
29	ALL	Passed	D_029_NONE
30	ALL	Passed	D_030_NONE
31	ALL	Passed	D_031_NONE
32	OFFLINE		
33	ALL	Passed	D_033_NONE
34	ALL	Passed	D_034_NONE
35	OFFLINE		
36	OFFLINE		
37	ALL	Passed	D_037_NONE
38	ALL	Passed	D_038_NONE
39	OFFLINE		
40	OFFLINE		
41	ALL	Passed	D_041_NONE
42	ALL	Passed	D_042_NONE
43	OFFLINE		
44	OFFLINE		
45	ALL	Passed	D_045_NONE
46	ALL	Passed	D_046_NONE
47	ALL	Passed	D_047_NONE
48	ALL	Passed	D_048_NONE

APPROVAL DATE: 5/29/07 APPROVAL TIME: 05:30

APPROVED BY: [signature] PROCEDURE #

SECTION XI

ANALYTICAL DATA (RADIUM-228)

Work Order	07-05098
Analysis Code	Ra228
Run	1
Date Received	5/18/2007
Lab Deadline	6/1/2007
Client	Environmental Chemical Corporation
Project	Li Tungsten
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 904.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1493.09
Carrier	Yttirum
Carrier Conc (mg/ml)	31.81

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		05/18/07 00:00	1.0000E+00
02	MBL	BLANK		05/18/07 00:00	1.0000E+00
03	DUP	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0648E+00
04	DO	5601-FSS-SU5-1015	62	11/21/06 11:10	1.0982E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

07-05098
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6952	1038.0	438.5	93.78	2.000	0.0947	0.1615	0.0668	105.00	93.78	1.00	1.00
02	MBL	0.6881	1027.4	397.0	85.78	2.000	0.0944	0.1588	0.0644	101.23	85.78	1.00	1.00
03	DUP	0.6842	1021.6	383.4	83.32	2.000	0.0947	0.1600	0.0653	102.64	83.32	1.00	1.00
04	DO	0.6899	1030.1	448.7	96.70	2.000	0.0949	0.1598	0.0649	102.01	96.70	1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

07-05098
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			05/23/07 07:54	JBARNARD	05/29/07 10:50	DJOHNSON	06/14/07 06:50	DJOHNSON
02	MBL			05/23/07 07:54	JBARNARD	05/29/07 10:50	DJOHNSON	06/14/07 06:50	DJOHNSON
03	DUP			05/23/07 07:54	JBARNARD	05/29/07 10:50	DJOHNSON	06/14/07 06:50	DJOHNSON
04	DO	05/22/07 07:46	KSALLINGS	05/23/07 07:54	JBARNARD	05/29/07 10:50	DJOHNSON	06/14/07 06:50	DJOHNSON

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-Ra228-1

Client	Eberline Services Work Order	Analysis Code	Run
Environmental Chemical Corporation	07-05098	Ra228	1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/g	1.66E+01	8.64E-01	1.04E+00	1.93E+01	85.68	OK		OK	
02	RA-228	MBL	BLANK	pCi/g	4.15E-01	4.88E-01	1.15E+00					OK	OK
03	RA-228	DUP	5601-FSS-SU5-1015	pCi/g	2.00E-01	4.14E-01	9.90E-01				INV	OK	
04	RA-228	DO	5601-FSS-SU5-1015	pCi/g	-8.44E-02	3.21E-01	7.95E-01					OK	

Run	Analysis Code	Eberline Services Work Order	Client
1	Ra228	07-05098	Environmental Chemical Corporation

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	05/18/07 00:00	1.00E+00	93.78	105.00	93.78	1.00	5/29/2007 10:50	6/14/2007 6:50
02	RA-228	MBL	05/18/07 00:00	1.00E+00	85.78	101.23	85.78	1.00	5/29/2007 10:50	6/14/2007 6:50
03	RA-228	DUP	11/21/06 11:10	1.06E+00	83.32	102.64	83.32	1.00	5/29/2007 10:50	6/14/2007 6:50
04	RA-228	DO	11/21/06 11:10	1.10E+00	96.70	102.01	96.70	1.00	5/29/2007 10:50	6/14/2007 6:50

Preliminary Data Report & Analytical Calculations

Work Order: 07-05098-Ra228-1

Client	Environmental Chemical Corporation
Eberline Services Work Order	07-05098
Analysis Code	Ra228
Run	1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	06/14/07 09:14		LB4110R	B1	180	2166	1.666666667	0.469663783
02	RA-228	MBL	06/14/07 09:14		LB4110R	B2	180	339	1.65	0.46172497
03	RA-228	DUP	06/14/07 09:14		LB4110R	B3	180	280	1.433333333	0.483813381
04	RA-228	DO	06/14/07 09:14		LB4110R	B4	180	223	1.3	0.480063304

Count Room Report
Client: Environmental Chemical Co

07-05098-Ra228-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	05/18/07 00:00	1.0000	0.6952	1037.9962	438.5000	93.78	1.00	1.00
02	MBL	BLANK	05/18/07 00:00	1.0000	0.6881	1027.3952	397.0000	85.78	1.00	1.00
03	DUP	5601-FSS-SU5-1015	11/21/06 11:10	1.0648	0.6842	1021.5722	383.4000	83.32	1.00	1.00
04	DO	5601-FSS-SU5-1015	11/21/06 11:10	1.0982	0.6899	1030.0828	448.7000	96.70	1.00	1.00

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
07-05098	1	Ra228	5/23/2007 7:54	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-10	104.831	5/23/2007	0.390	0.4094				19.33	0.870	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1493.090	5/23/2007	0.6952	0.6800
02	Ba-133	Ba-6a	1493.090	5/23/2007	0.6881	0.6800
03	Ba-133	Ba-6a	1493.090	5/23/2007	0.6842	0.6800
04	Ba-133	Ba-6a	1493.090	5/23/2007	0.6899	0.6800

Balance Printer Tapes

Tracer

LCS

Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

Aliquot Worksheet

Printed: 5/23/2007 8:10 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
07-05098	1	Ra228	grams	6/1/2007	JBARNARD

Lab Fraction	Environmental Chemical Corporation Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	5601-FSS-SU5-1015	DUP					1.0648E+00	1.0648E+00				
04	5601-FSS-SU5-1015	DO					1.0982E+00	1.0982E+00				

Comments	

Technician: _____ Date: 5/23/07

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
07-05098	1	Ra228	Yttirum	31.8100	DJOHNSON

TRetec Fraction	Environmental Chemical Corporation Client ID	Sample Type	Carrier Data	Filter Data			Gravimetric
			Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	% Recovery
01	LCS	LCS	2.0000	0.0947	0.1615	**0.0668**	**105.00**
02	BLANK	MBL	2.0000	0.0944	0.1588	**0.0644**	**101.23**
03	DUP	DUP	2.0000	0.0947	0.1600	**0.0653**	**102.64**
04	5601-FSS-SU5-1015	DO	2.0000	0.0949	0.1598	**0.0649**	**102.01**

Technician: DJ Date: 6/14/07

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Printed: 5/22/2007 7:46 AM

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
07-05098	6/1/2007	5/21/2007	5/22/2007	5/23/2007	KSALLINGS

Eberline	Environmental Chemical Corporation	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	5601-FSS-SU5-1015	28.2600	1656.3000	1501.9600	1628.0400	1473.7000	9.48%	90.52%			

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kennysallings Date: Analysis: Rough Prep Logbook

Analysis: Ra228 Page No. 5628

6/14/07

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
B1	0705098-01	26	2166	180	1400	6/14/07 12:14
B2	0705098-02	34	339	180	1400	6/14/07 12:14
B3	0705098-03	25	280	180	1400	6/14/07 12:14
B4	0705098-04	30	223	180	1400	6/14/07 12:14

282

GPC Detector Report
(ALL Backgrounds)

MK 6.14.07

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	7/10/2006	6/14/2007	1.67E-02	P	-1.26E-01	1.31E-01	3.89E-01
LB4110A - A2	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-4.78E-02	1.05E-01	2.58E-01
LB4110A - A3	Alpha	7/10/2006	6/14/2007	5.00E-02	P	-2.69E-01	1.14E-01	4.96E-01
LB4110A - A4	Alpha	7/10/2006	6/14/2007	1.17E-01	P	-9.34E-02	1.63E-01	4.20E-01
LB4110A - B1	Alpha	7/10/2006	6/14/2007	6.67E-02	P	-4.84E-02	9.64E-02	2.41E-01
LB4110A - B2	Alpha	7/10/2006	6/14/2007	8.33E-02	P	-4.13E-02	2.49E-01	5.39E-01
LB4110A - B3	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-5.03E-02	9.96E-02	2.50E-01
LB4110A - B4	Alpha	7/10/2006	6/14/2007	1.83E-01	P	-1.84E-01	8.58E-02	3.55E-01
LB4110A - C1	Alpha	7/10/2006	6/14/2007	1.67E-02	P	-4.97E-02	8.86E-02	2.27E-01
LB4110A - C2	Alpha	7/10/2006	6/14/2007	1.17E-01	P	-8.90E-02	1.01E-01	2.92E-01
LB4110A - C3	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-1.43E-01	1.19E-01	3.81E-01
LB4110A - C4	Alpha	7/10/2006	6/14/2007	5.00E-02	P	-5.52E-02	9.25E-02	2.40E-01
LB4110A - D1	Alpha	7/10/2006	6/14/2007	8.33E-02	P	-1.03E-01	1.58E-01	4.18E-01
LB4110A - D2	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-2.34E-01	2.39E-01	7.12E-01
LB4110A - D3	Alpha	7/10/2006	6/14/2007	5.00E-02	P	-1.35E-01	1.67E-01	4.69E-01
LB4110A - D4	Alpha	7/10/2006	6/14/2007	5.00E-02	P	-4.26E-02	1.38E-01	3.19E-01
LB4110R - A1	Alpha	7/10/2006	6/14/2007	6.67E-02	P	-5.27E-02	1.24E-01	3.01E-01
LB4110R - A2	Alpha	7/10/2006	6/14/2007	6.67E-02	P	-5.87E-02	1.77E-01	4.12E-01
LB4110R - A3	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-3.83E-02	1.26E-01	2.91E-01
LB4110R - A4	Alpha	7/10/2006	6/14/2007	1.17E-01	P	-2.82E-02	1.15E-01	2.58E-01
LB4110R - B1	Alpha	7/10/2006	6/14/2007	1.00E-01	P	-2.20E-02	1.18E-01	2.57E-01
LB4110R - B2	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-1.73E-02	1.31E-01	2.80E-01
LB4110R - B3	Alpha	7/10/2006	6/14/2007	1.33E-01	P	-4.15E-02	1.11E-01	2.64E-01
LB4110R - B4	Alpha	7/10/2006	6/14/2007	8.33E-02	P	-3.53E-02	1.23E-01	2.82E-01
LB4110R - C1	Alpha	7/10/2006	6/14/2007	1.00E-01	P	-1.97E-02	1.50E-01	3.20E-01
LB4110R - C2	Alpha	7/10/2006	6/14/2007	2.50E-01	P	-3.44E-02	1.45E-01	3.25E-01
LB4110R - C3	Alpha	7/10/2006	6/14/2007	2.33E-01	P	-9.02E-03	1.80E-01	3.69E-01
LB4110R - C4	Alpha	7/10/2006	6/14/2007	2.17E-01	P	-4.02E-02	1.33E-01	3.07E-01
LB4110R - D1	Alpha	7/10/2006	6/14/2007	5.00E-02	P	-4.80E-02	1.47E-01	3.43E-01
LB4110R - D2	Alpha	7/10/2006	6/14/2007	1.17E-01	P	-1.57E-02	1.37E-01	2.89E-01
LB4110R - D3	Alpha	7/10/2006	6/14/2007	3.33E-02	P	-4.48E-02	1.04E-01	2.53E-01
LB4110R - D4	Alpha	7/10/2006	6/14/2007	1.83E-01	P	-1.60E-02	1.33E-01	2.82E-01
LB5100 - 1	Alpha	7/10/2006	6/14/2007	3.00E-02	P	-1.20E-02	9.57E-02	2.03E-01

GPC Detector Report
(ALL Backgrounds)

MC 6.14.07

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	7/10/2006	6/14/2007	9.67E-01	P	-9.22E-01	1.29E+00	3.50E+00
LB4110A - A2	Beta	7/10/2006	6/14/2007	3.70E+00	P	-1.70E+00	2.75E+00	7.20E+00
LB4110A - A3	Beta	7/10/2006	6/14/2007	7.67E-01	P	1.20E-01	1.22E+00	2.31E+00
LB4110A - A4	Beta	7/10/2006	6/14/2007	2.75E+00	P	-5.42E-01	2.41E+00	5.36E+00
LB4110A - B1	Beta	7/10/2006	6/14/2007	1.20E+00	P	5.59E-01	1.47E+00	2.38E+00
LB4110A - B2	Beta	7/10/2006	6/14/2007	1.37E+00	P	7.60E-01	1.25E+00	1.74E+00
LB4110A - B3	Beta	7/10/2006	6/14/2007	1.58E+00	P	1.03E+00	1.60E+00	2.17E+00
LB4110A - B4	Beta	7/10/2006	6/14/2007	1.38E+00	P	-2.47E-01	1.45E+00	3.14E+00
LB4110A - C1	Beta	7/10/2006	6/14/2007	1.13E+00	P	8.17E-01	1.38E+00	1.94E+00
LB4110A - C2	Beta	7/10/2006	6/14/2007	1.28E+00	P	2.30E-01	1.66E+00	3.09E+00
LB4110A - C3	Beta	7/10/2006	6/14/2007	1.72E+00	P	8.69E-01	1.47E+00	2.07E+00
LB4110A - C4	Beta	7/10/2006	6/14/2007	1.52E+00	P	8.72E-01	1.44E+00	2.01E+00
LB4110A - D1	Beta	7/10/2006	6/14/2007	1.22E+00	P	8.83E-01	1.37E+00	1.86E+00
LB4110A - D2	Beta	7/10/2006	6/14/2007	1.25E+00	P	8.43E-01	1.27E+00	1.71E+00
LB4110A - D3	Beta	7/10/2006	6/14/2007	1.17E+00	P	3.17E-01	1.38E+00	2.45E+00
LB4110A - D4	Beta	7/10/2006	6/14/2007	1.58E+00	P	-6.91E-01	1.57E+00	3.83E+00
LB4110R - A1	Beta	7/10/2006	6/14/2007	1.50E+00	P	8.57E-01	1.41E+00	1.97E+00
LB4110R - A2	Beta	7/10/2006	6/14/2007	1.02E+00	P	6.74E-01	1.60E+00	2.52E+00
LB4110R - A3	Beta	7/10/2006	6/14/2007	1.66E+01	W	-8.88E+00	4.84E+00	1.86E+01
LB4110R - A4	Beta	7/10/2006	6/14/2007	1.25E+00	P	-2.52E-01	1.55E+00	3.35E+00
LB4110R - B1	Beta	7/10/2006	6/14/2007	1.67E+00	P	9.54E-01	2.06E+00	3.17E+00
LB4110R - B2	Beta	7/10/2006	6/14/2007	1.65E+00	P	1.07E+00	1.74E+00	2.40E+00
LB4110R - B3	Beta	7/10/2006	6/14/2007	1.43E+00	P	7.79E-01	1.33E+00	1.87E+00
LB4110R - B4	Beta	7/10/2006	6/14/2007	1.30E+00	P	8.70E-01	1.29E+00	1.71E+00
LB4110R - C1	Beta	7/10/2006	6/14/2007	1.58E+00	P	9.61E-01	1.60E+00	2.25E+00
LB4110R - C2	Beta	7/10/2006	6/14/2007	1.45E+00	P	8.31E-01	1.41E+00	1.98E+00
LB4110R - C3	Beta	7/10/2006	6/14/2007	1.33E+00	P	-6.89E-01	1.52E+00	3.73E+00
LB4110R - C4	Beta	7/10/2006	6/14/2007	1.10E+00	P	7.61E-03	1.32E+00	2.63E+00
LB4110R - D1	Beta	7/10/2006	6/14/2007	1.38E+00	P	1.02E+00	1.53E+00	2.04E+00
LB4110R - D2	Beta	7/10/2006	6/14/2007	1.35E+00	P	8.73E-01	1.33E+00	1.79E+00
LB4110R - D3	Beta	7/10/2006	6/14/2007	1.28E+00	P	7.62E-01	1.41E+00	2.06E+00
LB4110R - D4	Beta	7/10/2006	6/14/2007	1.58E+00	P	7.61E-01	1.25E+00	1.74E+00
LB5100 - 1	Beta	7/10/2006	6/14/2007	1.53E+00	P	1.01E+00	1.41E+00	1.81E+00

GPC Detector Report
(ALL Efficiencies)

MC 6-14-07

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	7/10/2006	6/14/2007	0.2549	P	0.2093	0.2534	0.2975
LB4110A - A2	Alpha	7/10/2006	6/14/2007	0.2194	P	0.1897	0.2313	0.2729
LB4110A - A3	Alpha	7/10/2006	6/14/2007	0.2311	P	0.1896	0.2298	0.2700
LB4110A - A4	Alpha	7/10/2006	6/14/2007	0.2467	P	0.1994	0.2416	0.2838
LB4110A - B1	Alpha	7/10/2006	6/14/2007	0.2452	P	0.2030	0.2455	0.2879
LB4110A - B2	Alpha	7/10/2006	6/14/2007	0.2374	P	0.1989	0.2421	0.2853
LB4110A - B3	Alpha	7/10/2006	6/14/2007	0.2560	P	0.2087	0.2521	0.2955
LB4110A - B4	Alpha	7/10/2006	6/14/2007	0.2500	P	0.2101	0.2540	0.2979
LB4110A - C1	Alpha	7/10/2006	6/14/2007	0.2267	P	0.1880	0.2338	0.2797
LB4110A - C2	Alpha	7/10/2006	6/14/2007	0.2324	P	0.1917	0.2362	0.2807
LB4110A - C3	Alpha	7/10/2006	6/14/2007	0.2482	P	0.1848	0.2446	0.3045
LB4110A - C4	Alpha	7/10/2006	6/14/2007	0.2426	P	0.2014	0.2469	0.2924
LB4110A - D1	Alpha	7/10/2006	6/14/2007	0.2468	P	0.2039	0.2485	0.2932
LB4110A - D2	Alpha	7/10/2006	6/14/2007	0.2724	P	0.2207	0.2687	0.3166
LB4110A - D3	Alpha	7/10/2006	6/14/2007	0.2696	P	0.2204	0.2685	0.3167
LB4110A - D4	Alpha	7/10/2006	6/14/2007	0.2193	P	0.1815	0.2296	0.2777
LB4110R - A1	Alpha	7/10/2006	6/14/2007	0.2513	P	0.2201	0.2478	0.2756
LB4110R - A2	Alpha	7/10/2006	6/14/2007	0.2282	P	0.2066	0.2327	0.2587
LB4110R - A3	Alpha	7/10/2006	6/14/2007	0.2361	P	0.2224	0.2373	0.2521
LB4110R - A4	Alpha	7/10/2006	6/14/2007	0.2456	P	0.2254	0.2479	0.2704
LB4110R - B1	Alpha	7/10/2006	6/14/2007	0.2307	P	0.2214	0.2369	0.2525
LB4110R - B2	Alpha	7/10/2006	6/14/2007	0.2249	P	0.2138	0.2276	0.2415
LB4110R - B3	Alpha	7/10/2006	6/14/2007	0.2549	P	0.2472	0.2556	0.2640
LB4110R - B4	Alpha	7/10/2006	6/14/2007	0.2403	P	0.2363	0.2475	0.2588
LB4110R - C1	Alpha	7/10/2006	6/14/2007	0.2180	P	0.1641	0.2200	0.2760
LB4110R - C2	Alpha	7/10/2006	6/14/2007	0.2238	P	0.1694	0.2275	0.2855
LB4110R - C3	Alpha	7/10/2006	6/14/2007	0.2405	P	0.2011	0.2431	0.2852
LB4110R - C4	Alpha	7/10/2006	6/14/2007	0.2333	P	0.2136	0.2395	0.2653
LB4110R - D1	Alpha	7/10/2006	6/14/2007	0.2254	P	0.2171	0.2336	0.2501
LB4110R - D2	Alpha	7/10/2006	6/14/2007	0.2609	P	0.2504	0.2583	0.2662
LB4110R - D3	Alpha	7/10/2006	6/14/2007	0.2596	P	0.2506	0.2590	0.2674
LB4110R - D4	Alpha	7/10/2006	6/14/2007	0.2182	P	0.2050	0.2273	0.2496
LB5100 - 1	Alpha	7/10/2006	6/14/2007	0.3457	P	0.3318	0.3455	0.3592

282

SECTION XII

BARIUM-133 ANALYTICAL TRACER DATA

VAX/VMS Peak Search Report Generated 29-MAY-2007 14:46:30.20 μ 5-29-07

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_070509801_GE3_BAFIL_110282.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 29-MAY-2007 00:00:00
Sample ID : 0705098-01
Sample type : FILTER
Detector name : GE3
Elapsed live time: 0 00:15:00.00
Start channel : 25
Sensitivity : 3.00000
Critical level : No

Acquisition date : 29-MAY-2007 14:31:10
Sample Quantity : 1.00000E+00 filter
Sample Geometry : 0
Detector Geometry: BAFIL
Elapsed real time: 0 00:15:01.54 0.2%
End channel : 4096
Gaussian : 10.00000

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	5	62.28	335	62	1.60	62.98	59	15	3.72E-01	6.5	4.93E+00
2	5	66.25	169	66	2.13	66.95	59	15	1.88E-01	11.8	
3	5	69.44	20	41	1.46	70.13	59	15	2.22E-02	62.0	
4	1	81.41	955	50	1.48	82.10	77	11	1.06E+00	3.4	1.72E+01
5	1	84.18	30	33	1.49	84.86	77	11	3.29E-02	62.1	
6	0	93.69	56	118	1.85	94.37	89	10	6.25E-02	38.4	
7	4	112.25	279	53	1.77	112.93	109	15	3.10E-01	7.1	1.76E+00
8	4	116.49	79	55	2.02	117.17	109	15	8.79E-02	21.0	
9	0	144.97	18	55	1.49	145.63	143	6	1.98E-02	70.0	
10	0	161.51	55	71	1.41	162.16	159	7	6.11E-02	28.8	
11	0	179.16	20	46	1.39	179.80	178	5	2.24E-02	55.3	
12	0	276.84	66	54	1.89	277.44	272	11	7.35E-02	24.9	
13	2	303.43	176	16	1.43	304.02	300	12	1.95E-01	8.1	7.72E-01
14	2	307.69	35	22	1.93	308.28	300	12	3.93E-02	32.1	
15	0	333.52	43	74	1.48	334.10	331	8	4.83E-02	37.1	
16	0	339.08	30	26	1.91	339.66	338	6	3.32E-02	33.7	
17	0	356.72	646	39	1.55	357.29	353	9	7.18E-01	4.3	
18	0	365.46	16	22	1.74	366.02	363	7	1.81E-02	53.0	
19	1	377.28	18	7	1.82	377.83	374	25	2.03E-02	35.1	2.05E+00
20	1	384.61	184	6	1.82	385.17	374	25	2.04E-01	7.4	
21	1	387.61	239	4	1.74	388.17	374	25	2.66E-01	7.1	
22	1	391.61	53	3	1.83	392.17	374	25	5.89E-02	22.8	
23	1	415.29	54	16	1.85	415.83	411	15	6.03E-02	17.2	2.34E+00
24	1	418.61	32	8	1.85	419.15	411	15	3.52E-02	31.1	
25	1	422.53	21	2	1.85	423.06	411	15	2.31E-02	34.3	
26	0	437.57	132	0	1.67	438.10	433	9	1.47E-01	8.7	
27	0	456.76	12	5	2.68	457.28	455	8	1.33E-02	41.7	
28	0	469.28	23	11	1.56	469.80	465	7	2.50E-02	31.9	
29	3	511.08	16	5	2.32	511.58	507	11	1.81E-02	37.0	1.09E+00
30	3	514.33	6	6	1.92	514.83	507	11	6.13E-03	93.7	
31	0	609.03	11	5	1.79	609.49	606	7	1.22E-02	45.6	
32	0	695.44	5	4	1.80	695.86	692	7	6.05E-03	71.4	

Acquisition date : 29-MAY-2007 14:31:10

Total number of lines in spectrum	32	
Number of unidentified lines	28	
Number of lines tentatively identified by NID	4	12.50%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.385E+02	4.385E+02	0.811E+02	18.50	
	Total Activity :		4.385E+02	4.385E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	6.972E+02	6.972E+02	1.017E+02	14.59	
	Total Activity :		6.972E+02	6.972E+02			

Grand Total Activity : 1.136E+03 1.136E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.982E+01	4.385E+02	4.385E+02	18.50	OK
	302.84	17.80	5.790E+00	5.115E+02	5.115E+02	33.09	OK
	356.01	60.00	6.459E+00	5.005E+02	5.006E+02	17.82	OK

Final Mean for 3 Valid Peaks = 4.385E+02+/- 8.112E+01 (18.50%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	3.797E+01	6.972E+02	6.972E+02	14.59	OK

Final Mean for 1 Valid Peaks = 6.972E+02+/- 1.017E+02 (14.59%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.385E+02	8.112E+01	1.787E+01	2.990E+00	24.544
TH-234	6.972E+02	1.017E+02	7.953E+01	4.198E+00	8.766

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.673E+00		8.097E+00	1.283E+01	2.731E+00	-0.130
CD-109	-2.653E+01		1.128E+02	1.572E+02	1.907E+01	-0.169
PA-231	0.000E+00		0.000E+00	1.933E-01	3.873E-03	0.000
PA-234	0.000E+00		0.000E+00	1.251E-01	2.507E-03	0.000
NP-237	8.642E+00		3.335E+01	5.019E+01	5.868E+00	0.172
AM-241	8.661E+00		5.126E+00	9.461E+00	4.166E-01	0.915

210A

VAX/VMS Peak Search Report Generated 29-MAY-2007 15:07:50.54 m 5-29-07

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_070509802_GE3_BAFIL_110284.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 29-MAY-2007 00:00:00 Acquisition date : 29-MAY-2007 14:52:31
Sample ID : 0705098-02 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE3 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.65 0.2%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	62.24	289	59	1.59	62.94	60	10	3.21E-01	7.3	2.72E+00
2	2	66.20	135	59	1.60	66.89	60	10	1.50E-01	13.3	
3	1	81.34	865	46	1.48	82.03	77	11	9.61E-01	3.6	8.92E+00
4	1	84.41	27	33	1.49	85.10	77	11	2.98E-02	62.7	
5	0	93.23	22	79	1.24	93.91	91	7	2.40E-02	71.6	
6	4	112.42	255	62	1.79	113.10	108	14	2.83E-01	7.7	2.35E+00
7	4	116.20	43	62	2.05	116.87	108	14	4.74E-02	40.0	
8	3	161.44	21	52	1.94	162.09	158	15	2.31E-02	59.8	1.40E+00
9	3	166.83	14	46	1.95	167.48	158	15	1.61E-02	83.1	
10	0	209.97	19	41	2.08	210.60	208	6	2.10E-02	59.8	
11	0	276.94	86	36	1.85	277.55	273	9	9.56E-02	16.6	
12	0	303.48	189	17	1.35	304.07	300	7	2.09E-01	8.2	
13	2	334.14	80	19	1.94	334.71	329	16	8.88E-02	13.9	1.71E+00
14	2	339.08	34	16	1.96	339.66	329	16	3.82E-02	26.3	
15	0	356.73	579	17	1.77	357.30	352	10	6.43E-01	4.4	
16	1	384.44	106	25	1.82	384.99	382	10	1.18E-01	13.2	1.78E+01
17	1	387.57	244	59	1.76	388.12	382	10	2.72E-01	8.4	
18	0	391.92	44	20	1.93	392.47	391	6	4.93E-02	24.5	
19	3	415.86	41	11	2.23	416.40	411	17	4.51E-02	22.2	2.07E+00
20	3	420.90	20	11	2.24	421.44	411	17	2.21E-02	42.2	
21	0	437.84	109	9	1.82	438.38	434	10	1.21E-01	11.0	
22	0	445.93	13	3	3.02	446.46	444	6	1.44E-02	34.8	
23	0	468.44	24	8	1.73	468.96	464	8	2.67E-02	28.9	
24	0	511.72	23	2	2.03	512.21	509	8	2.51E-02	23.8	
25	0	697.98	8	1	1.25	698.40	694	7	8.40E-03	46.0	

Acquisition date : 29-MAY-2007 14:52:31

Total number of lines in spectrum 25
Number of unidentified lines 21
Number of lines tentatively identified by NID 4 16.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.970E+02	3.970E+02	0.741E+02	18.66	
	Total Activity :		3.970E+02	3.970E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	6.016E+02	6.016E+02	0.962E+02	15.99	
	Total Activity :		6.016E+02	6.016E+02			

Grand Total Activity : 9.986E+02 9.987E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.982E+01	3.970E+02	3.970E+02	18.66	OK
	302.84	17.80	5.790E+00	5.493E+02	5.493E+02	33.19	OK
	356.01	60.00	6.459E+00	4.484E+02	4.484E+02	17.88	OK

Final Mean for 3 Valid Peaks = 3.970E+02+/- 7.408E+01 (18.66%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	3.797E+01	6.016E+02	6.016E+02	15.99	OK

Final Mean for 1 Valid Peaks = 6.016E+02+/- 9.620E+01 (15.99%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.970E+02	7.408E+01	1.611E+01	2.696E+00	24.641
TH-234	6.016E+02	9.620E+01	7.827E+01	4.132E+00	7.687

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-7.552E-01		7.923E+00	1.277E+01	2.718E+00	-0.059
CD-109	1.181E+01		1.080E+02	1.602E+02	1.944E+01	0.074
PA-231	0.000E+00		0.000E+00	1.933E-01	3.873E-03	0.000
PA-234	0.000E+00		0.000E+00	1.251E-01	2.507E-03	0.000
NP-237	1.266E+01		3.148E+01	4.869E+01	5.693E+00	0.260
AM-241	9.490E+00		4.736E+00	9.048E+00	3.984E-01	1.049

VAX/VMS Peak Search Report Generated 29-MAY-2007 15:24:37.40 m 5.29.07

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_070509803_GE3_BAFIL_110287.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : 5601-FSS-SU5-1015
Deposition Date :
Sample Date : 29-MAY-2007 00:00:00 Acquisition date : 29-MAY-2007 15:09:23
Sample ID : 0705098-03 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE3 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.70 0.2%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	59.57	24	68	1.59	60.28	58	16	2.66E-02	63.7	6.92E+00
2	2	62.30	282	62	1.59	63.00	58	16	3.14E-01	7.5	
3	2	66.23	93	56	1.60	66.93	58	16	1.03E-01	17.3	
4	2	69.30	19	43	1.33	70.00	58	16	2.07E-02	64.5	
5	0	81.45	835	110	1.32	82.14	78	8	9.28E-01	4.1	
6	0	112.08	182	135	1.33	112.76	110	7	2.03E-01	13.0	
7	0	193.32	27	56	2.66	193.96	190	7	3.00E-02	49.8	
8	0	224.68	14	39	2.50	225.31	223	5	1.51E-02	74.8	
9	2	273.55	8	6	1.72	274.16	273	15	9.08E-03	50.5	1.57E+00
10	2	277.13	58	13	1.90	277.73	273	15	6.47E-02	17.7	
11	3	303.55	170	7	1.44	304.15	300	18	1.89E-01	7.9	1.76E+00
12	3	308.09	34	14	2.13	308.68	300	18	3.77E-02	31.2	
13	3	312.20	14	15	2.13	312.78	300	18	1.56E-02	51.8	
14	0	334.79	63	48	1.72	335.37	332	7	6.95E-02	22.1	
15	0	339.37	21	22	1.75	339.95	338	6	2.34E-02	41.6	
16	2	356.68	592	17	1.49	357.25	353	16	6.57E-01	4.2	4.78E+00
17	2	365.44	10	30	1.99	366.01	353	16	1.14E-02	76.4	
18	1	384.44	122	14	1.82	384.99	381	16	1.36E-01	10.0	1.13E+01
19	1	387.61	225	10	1.77	388.17	381	16	2.50E-01	7.3	
20	1	391.61	44	8	1.83	392.17	381	16	4.92E-02	25.6	
21	4	415.00	47	13	2.30	415.54	411	15	5.21E-02	19.2	2.66E+00
22	4	419.24	43	6	2.46	419.78	411	15	4.81E-02	23.3	
23	0	437.65	116	2	1.74	438.18	433	10	1.28E-01	9.6	
24	0	468.30	29	5	2.21	468.82	465	7	3.19E-02	22.9	
25	0	511.24	31	0	2.07	511.74	507	10	3.44E-02	18.0	
26	0	620.60	6	2	2.95	621.05	618	6	7.15E-03	49.7	

Total number of lines in spectrum 26
Number of unidentified lines 21
Number of lines tentatively identified by NID 5 19.23%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.833E+02	3.834E+02	0.730E+02	19.05	
	Total Activity :		3.833E+02	3.834E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	5.876E+02	5.876E+02	0.964E+02	16.40	
AM-241	432.20Y	1.00	4.406E+00	4.406E+00	5.623E+00	127.64	
	Total Activity :		5.920E+02	5.920E+02			

Grand Total Activity : 9.753E+02 9.754E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.982E+01	3.833E+02	3.834E+02	19.05	OK
	302.84	17.80	5.790E+00	4.958E+02	4.959E+02	32.87	OK
	356.01	60.00	6.459E+00	4.584E+02	4.585E+02	17.72	OK

Final Mean for 3 Valid Peaks = 3.834E+02+/- 7.303E+01 (19.05%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	3.797E+01	5.876E+02	5.876E+02	16.40	OK

Final Mean for 1 Valid Peaks = 5.876E+02+/- 9.637E+01 (16.40%)

AM-241	59.54	35.90*	4.552E+01	4.406E+00	4.406E+00	127.64	OK

Final Mean for 1 Valid Peaks = 4.406E+00+/- 5.623E+00 (127.64%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.834E+02	7.303E+01	1.773E+01	2.967E+00	21.625
TH-234	5.876E+02	9.637E+01	7.827E+01	4.132E+00	7.508
AM-241	4.406E+00	5.623E+00	6.893E+00	3.035E-01	0.639

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	4.519E+00		8.292E+00	1.512E+01	3.219E+00	0.299
CD-109	-1.139E+00		1.142E+02	1.860E+02	2.257E+01	-0.006
PA-231	0.000E+00		0.000E+00	1.933E-01	3.873E-03	0.000
PA-234	0.000E+00		0.000E+00	1.251E-01	2.507E-03	0.000
NP-237	2.489E+01		3.160E+01	5.576E+01	6.519E+00	0.446

VAX/VMS Peak Search Report Generated 29-MAY-2007 15:41:03.81 μ 5-29-07

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_070508604_GE3_BAFIL_110290.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : 5601-FSS-SU5-1015
Deposition Date :
Sample Date : 29-MAY-2007 00:00:00
Sample ID : 0705086-04
Sample type : FILTER
Detector name : GE3
Elapsed live time: 0 00:15:00.00
Start channel : 25
Sensitivity : 3.00000
Critical level : No

Acquisition date : 29-MAY-2007 15:25:44
Sample Quantity : 1.00000E+00 filter
Sample Geometry : 0
Detector Geometry: BAFIL
Elapsed real time: 0 00:15:01.67 0.2%
End channel : 4096
Gaussian : 10.00000

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	62.23	246	62	1.45	62.93	58	17	2.74E-01	8.1	1.92E+00
2	1	66.23	118	56	1.46	66.93	58	17	1.31E-01	13.2	
3	1	71.17	15	53	1.47	71.87	58	17	1.69E-02	75.1	
4	3	81.47	977	41	1.42	82.16	77	12	1.09E+00	3.3	1.77E+00
5	3	84.86	45	34	1.80	85.55	77	12	5.02E-02	43.6	
6	0	93.42	38	77	2.67	94.11	90	9	4.20E-02	44.8	
7	1	112.18	242	46	1.53	112.86	108	14	2.69E-01	7.7	5.41E+00
8	1	116.46	54	47	1.54	117.14	108	14	5.97E-02	25.0	
9	0	145.03	33	95	4.98	145.69	140	10	3.71E-02	57.3	
10	0	160.67	12	87	1.02	161.33	160	6	1.36E-02	122.2	
11	0	277.94	32	56	1.79	278.54	275	9	3.60E-02	44.1	
12	1	303.38	182	10	1.52	303.97	300	11	2.03E-01	7.9	3.70E+00
13	1	307.48	39	10	1.76	308.07	300	11	4.28E-02	24.2	
14	0	334.68	74	27	1.39	335.25	331	7	8.26E-02	16.3	
15	0	338.99	30	15	1.81	339.57	338	6	3.33E-02	27.4	
16	0	356.75	584	30	1.75	357.31	352	10	6.49E-01	4.5	
17	0	364.82	18	15	1.16	365.39	363	6	2.00E-02	41.4	
18	1	384.36	132	17	1.82	384.92	382	16	1.46E-01	9.3	5.00E+00
19	1	387.61	261	13	1.73	388.17	382	16	2.90E-01	6.8	
20	1	391.61	47	11	1.83	392.17	382	16	5.21E-02	26.0	
21	1	415.30	34	9	1.85	415.84	411	16	3.80E-02	23.4	1.21E+00
22	1	418.63	19	11	1.85	419.17	411	16	2.16E-02	45.2	
23	0	437.80	129	11	1.98	438.33	433	11	1.44E-01	10.1	
24	0	446.66	8	3	2.86	447.19	444	6	8.89E-03	49.2	
25	0	468.06	27	2	1.52	468.58	465	7	3.03E-02	20.8	
26	0	512.54	27	0	3.20	513.04	509	10	3.00E-02	19.2	

Acquisition date : 29-MAY-2007 15:25:44

Total number of lines in spectrum 26
Number of unidentified lines 21
Number of lines tentatively identified by NID 5 19.23%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.486E+02	4.487E+02	0.827E+02	18.44	
NP-237	2.14E+06Y	1.00	6.322E+01	6.322E+01	5.567E+01	88.05	
	Total Activity :		5.118E+02	5.119E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	5.129E+02	5.129E+02	0.895E+02	17.46	
	Total Activity :		5.129E+02	5.129E+02			

Grand Total Activity : 1.025E+03 1.025E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.982E+01	4.486E+02	4.487E+02	18.44	OK
	302.84	17.80	5.790E+00	5.316E+02	5.317E+02	32.84	OK
	356.01	60.00	6.459E+00	4.523E+02	4.524E+02	18.01	OK
	Final Mean for 3 Valid Peaks = 4.487E+02+/- 8.272E+01 (18.44%)						
NP-237	86.50	12.60*	1.705E+01	6.322E+01	6.322E+01	88.05	OK
	Final Mean for 1 Valid Peaks = 6.322E+01+/- 5.567E+01 (88.05%)						

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	3.797E+01	5.129E+02	5.129E+02	17.46	OK
	Final Mean for 1 Valid Peaks = 5.129E+02+/- 8.953E+01 (17.46%)						

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.487E+02	8.272E+01	1.672E+01	2.798E+00	26.834
TH-234	5.129E+02	8.953E+01	7.827E+01	4.132E+00	6.554
NP-237	6.322E+01	5.567E+01	3.970E+01	4.642E+00	1.593

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-6.106E-01		8.066E+00	1.301E+01	2.771E+00	-0.047
CD-109	2.426E+01		9.438E+01	1.458E+02	1.769E+01	0.166
PA-231	0.000E+00		0.000E+00	1.933E-01	3.873E-03	0.000
PA-234	0.000E+00		0.000E+00	1.251E-01	2.507E-03	0.000
AM-241	1.138E+01		4.882E+00	9.778E+00	4.306E-01	1.164